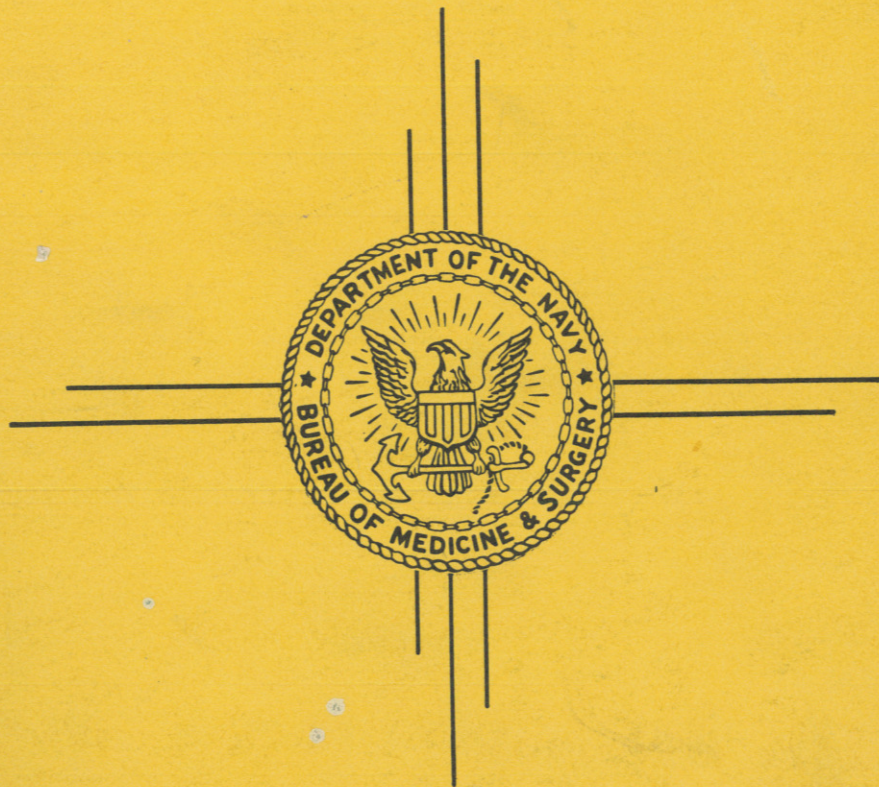


Casualty Care Training Manual

for Dental Personnel



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CASUALTY CARE TRAINING MANUAL

For Dental Personnel

Prepared by

U. S. Naval Dental School
National Naval Medical Center
Bethesda, Maryland

Under the Supervision of

Bureau of Medicine and Surgery
Department of the Navy
Washington, D. C.



May 1962

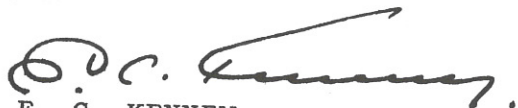
FOREWORD

Preparation for care of the injured in the event of an emergency or disaster resulting in mass casualties calls for the marshaling of assistance from all possible sources in order to provide maximum support to the medical officer.

Foremost among those who might further extend the services of the physician stand the members of the dental profession. The dental officer is one on whom the medical officer often depends for medical assistance.

The effectiveness of such assistance depends upon the possession of knowledge and skill; thus, to be effectively integrated into the medical effort, the dental officer and dental enlisted personnel must be thoroughly trained. This manual is prepared as an aid for such instruction and training.

With trained personnel, all parts of the Medical Department of the Navy can maintain that constant state of readiness which enables the Navy to contribute to the needs of the Nation in the event of emergency or disaster.



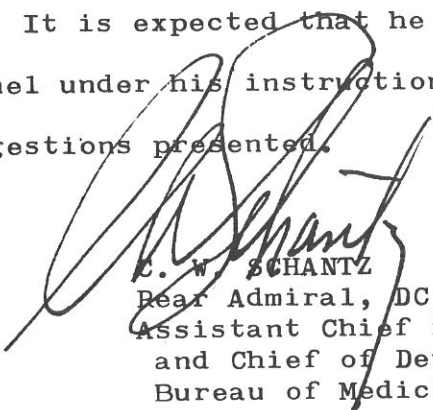
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Surgery

PREFACE

This manual has been prepared as a guide for training dental officers and dental technicians in casualty care procedures.

Training in the treatment of mass casualties is necessary to cope with the results of major disasters--either those of natural origin or those precipitated by human actions--or with military conditions which would make ideal casualty treatment impossible. Under such circumstances there may be a shortage or absence of medical personnel in many areas. Therefore this training is designed to supplement the education of dental officers and dental technicians in those casualty care measures which will enable them to save lives if acting independently, and which will augment the efforts of medical officers when they are present.

Instructions are given to guide the instructor in organizing and conducting his course. It is expected that he will be guided by the needs of the personnel under his instruction in elaborating and expanding upon the suggestions presented.



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INTRODUCTION

Background

The experiences of World War II and the Korean Conflict indicated that the full potential of dental personnel abilities was not being realized. Although dental officers performed capably and commendably in their professional capacities, there were emergency occasions or battle situations when the special training of the dental officer should have prepared him to make a more effective contribution to the medical effort than he did. Too many times he could engage only in tasks which lay personnel might have accomplished with equal effectiveness, for his lack of training in practical emergency assistance hampered the application of his special knowledge and caused the total medical effort to remain below the possible level of success.

Conditions brought into existence by a conflict involving the use of thermonuclear weapons would serve to exaggerate this discrepancy. Anticipated casualties far exceed any number for which available medical personnel could provide adequate care. In such circumstances the dental officer should be able to do much more than attend to dental health needs, yet he has no practical training which would enable him to be of direct medical assistance.

A Course in Casualty Care

Consideration of this problem has led to the establishment of a training course for dental officers in the emergency care of casualties. The aim of the course is to provide practical training in emergency casualty treatment in such a way as to utilize the dental officer's fundamental knowledge of the biologic sciences. The course contains far more than the mechanics of basic first aid or even the procedures of advanced first aid. It does not, however, seek to prepare the dental officer to administer treatment on the same level as does the medical officer; nor does it pretend to make a physician out of a dentist. It does hope to provide the dental officer with such skills, based on his special knowledge and training, as will enable him to contribute as fully as possible to the medical effort.

It is not paradoxical to say that the course is adaptable to the training of dental enlisted personnel. Although obviously not as comprehensively trained in the biologic sciences as a dental officer, the dental technician possesses more scientific knowledge than does the average layman. Accordingly, potentially he is able to render a greater contribution to a total medical effort than one who is acquainted only with basic first aid procedures. The instructor's judicious adaptation of the course material to the dental technician's level of information and the extensive use of training aids throughout the course will enable the technician to perform his full duty properly and to become part of a force which is prepared to cope with any major emergency.

Course Objectives

In keeping with the foregoing considerations it may be said that the specific objectives for the course are (1) to develop in dental officers such skills in emergency casualty treatment as will make full use of their professional knowledge, thus enabling them to amplify the medical effort in time of major national emergency; (2) to develop in dental officers such skills in emergency casualty treatment as will enable them to perform their duties as required by Navy Regulations, the Bureau of Naval Personnel Manual, the Manual of the Medical Department, and Navy Directives; and (3) to contribute to the improvement of the dental officer's professional performance through an increased knowledge and understanding of systemic conditions which may manifest themselves or be reflected in the oral situation.

Function of the Manual

This manual has been designed and prepared as a guide in planning, organizing, preparing, and presenting the results of a course of instruction in casualty care. The dental officer who will be the instructor has already received training in casualty care, together with some advice and precepts related to the process of instruction itself. Therefore he is familiar with the content, procedures, and materials of the course, which are outlined in the lesson plans. It is hoped that the manual will assist him to adapt this knowledge for optimum benefit to each trainee group in every learning situation.

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TITLE: DENTISTRY--AN AID IN DISASTER

OBJECTIVES

- I. To develop trainee understanding of the need for planning and training in order to survive the effects of nuclear warfare
- II. To develop a realization of the special preparation of dental officers and their obligation to render casualty treatment in time of disaster
- III. To inform the trainee of measures he can use to train others in lifesaving procedures

TRAINING AIDS

- I. The films listed below are for use at the option of the instructor, depending on the time he has available and the special needs of the group of trainees
 - A. House in the Middle. FCDA film, black and white, sound, 12 minutes
 - B. Medical Effects of the Atomic Bomb, Part I (MA-6916A). Color, sound, 35 minutes
 - C. What Price Iwo (MN-6519). Color, sound, 11 minutes
- II. FCDA films are available at state or regional offices of the Office of Civil and Defense Mobilization

REFERENCES

- I. American Medical Association: Summary Report on National Emergency Medical Care. Chicago: American Medical Association, Oct. 1959
- II. U. S. Federal Civil Defense Administration: Civil Defense in Outline. Washington: U. S. Government Printing Office, 1951

LESSON PLAN 1

- III. U. S. Federal Civil Defense Administration: Organization and Operation of Civil Defense Casualty Services (TM-11-1). Washington: U. S. Government Printing Office, 1953
- IV. U. S. Federal Civil Defense Administration: Principles of Civil Defense Operations (AG-8-1). Washington: U. S. Government Printing Office, 1951
- V. U. S. Federal Civil Defense Administration: The Dentist in Civil Defense (TM-11-9). Washington: U. S. Government Printing Office, 1953
- VI. Bowers, W. F. and Hughes, C. W.: Surgical Philosophy in Mass Casualty Management. Springfield, Ill.: Charles C Thomas, 1960

INTRODUCTION

- I. If you are new to the group, introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. Introduce the course as a whole
 - B. Indicate the nature and scope of the course content
 - C. Explain and clarify the part which the dental profession will be called upon to take in the event of emergency or thermonuclear disaster

PRESENTATION

- I. The need to prepare for disasters
 - A. Human existence depends on adequate preparation to withstand unforeseen and unpredictable events
 - 1. Of natural origin: floods, hurricanes, tornadoes
 - a. Possibility of occurrence commonly accepted

- b. Routinely prepared for
- 2. Precipitated by human action: atomic or thermonuclear bombings
 - a. Attack with little or no warning is a possibility
 - b. Must be included among those disasters for which to prepare
 - c. Survival will depend upon nature and extent of preparations made for attack

II. Results of atomic or thermonuclear disaster

A. Casualties: more than half the total population

1. 180,000 in city of 250,000

2. Types of injuries

- a. Traumatic injuries
- b. Burns
- c. Radiation injuries
- d. Combinations of such injuries

B. Complete destruction of essential items of civilization

1. Supplies

- a. Food
- b. Water

2. Communications

3. Sewage disposal services

4. Electric power

III. Casualty care under disaster conditions

- A. Importance: returning workers to essential duties with a minimum loss of hours may determine survival

LESSON PLAN 1

B. Cooperation

1. Success of the medical effort will depend on cooperation of services within the Civil Defense organization
2. Each should understand the problems and limitations of the other so that all may help attain the common goal

C. Self-reliance: resourcefulness and ability to improvise will be necessary

IV. Problems connected with casualty care

A. Lack, or inaccessibility, of supplies

1. Central warehouses have been stocked by Federal Government with supplies according to estimated needs
2. 4 to 8 hours will be needed to obtain them

B. Inadequate facilities

1. (Cite number of mobile hospital units ordered)
2. City of 180,000 with 125,000 casualties will need 300 mobile hospitals

C. Lack of trained personnel

1. Too few physicians and nurses
2. Need will be exaggerated by casualties among trained personnel

V. Role of dental personnel in casualty care

A. Provide or assist in direct emergency care

1. More than 90,000 dentists available for such service
2. Qualifications
 - a. Sound basic medical science training
 - b. Experience in handling patients in extreme pain

- c. Manual dexterity
 - d. Close association with medical colleagues in mutual care of patients
 - e. Ability to remain calm in emergencies
 - B. Provide administrative assistance
 - 1. Sort casualties
 - 2. Organize casualty care teams
 - 3. Arrange for provision of supplies and facilities
 - C. Train others in casualty care
- VI. Need for practical training in casualty care
 - A. Dentists have limited practical experience in casualty care
 - B. Proper and extensive training is needed to develop basic skills
 - 1. First aid
 - 2. Emergency casualty care
- VII. Importance of this course
 - A. Provides practical training in emergency lifesaving procedures beyond the scope of many first aid courses, including functions recommended for health personnel by the American Medical Association
 - 1. Standard procedures
 - a. Control of hemorrhage
 - b. Emergency treatment of open chest wounds
 - c. Proper and adequate cleansing and treatment of wounds
 - d. Bandaging and splinting

LESSON PLAN 1

- e. Resuscitation
- f. Treatment of shock
- g. Preparation of casualties for transportation
- 2. Procedures utilizing special training of dental personnel
 - a. Relief of pain
 - b. Establishment and maintenance of a patent airway
 - c. Administration of anesthetics
 - d. Parenteral therapy
 - e. Recognition of signs and treatment of radiation injury
 - f. Triage of facial and oral injury cases, including oral surgery
 - g. Psychologic first aid
 - h. Battle dressing station duties
- B. Emphasizes performance
 - 1. Concern for information limited to effect on and contribution to performance
 - 2. Final examination is designed to reflect emphasis
 - a. Part will be written
 - b. Practical skill displayed in problematic situation will be most important
- C. Aims to enable dental personnel to give greatest assistance to medical effort in event of emergency or disaster

TITLE: BATTLE DRESSING STATION DUTY

OBJECTIVES

- I. To develop the trainee's information concerning the nature and functions of a battle dressing station aboard ship
- II. To ensure the trainee's knowledge of the duties to be performed by battle dressing station personnel, both during and after battle
- III. To inform the trainee of his responsibility to assist in the training of enlisted personnel in casualty care

TRAINING AIDS

- I. First aid supplies
- II. Battle dressing station equipment
- III. Surgical instrument and supply set L6545-927-4960
- IV. Chalkboard, chalk, eraser

REFERENCE

U. S. Federal Civil Defense Administration: Emergency Action to Save Lives (PA-5). Washington: U. S. Government Printing Office, 1951

INTRODUCTION

- I. If you are new to the group, introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. To know how to operate a battle dressing station is part of the military duty of naval dental personnel
 - B. To know the procedures involved is essential for the performance of duty

LESSON PLAN 2

PRESENTATION

I. Battle dressing stations

A. Definition: casualty treatment centers manned by the ship's medical department

B. Purposes

1. To treat casualties as promptly as possible
 - a. Return least wounded to duty
 - b. Raise survival chances of seriously wounded
2. To arrange for casualty transportation
 - a. To main battle dressing stations or sick bay
 - b. To medical transport or hospital ship
3. To aid in casualty evacuation if the order to abandon ship is given

C. Number and locations

1. Varied according to ship type and size
2. Dispersed
 - a. Damage to one part of the ship will not disrupt the functioning of the entire medical department
 - b. Sick bay may be designated as main station; others located where aid can be given to greatest number
3. Protected
 - a. Below armored decks when possible
 - b. Ship's watertight integrity must be maintained
4. Accessible to ship's battle stations

II. Battle dressing station personnel

A. Assignment

1. Officer in charge: Dental or Medical Corps officer
2. Medical treatment team: several hospital and dental corpsmen to assist officer in charge
3. Litter bearers: assigned from personnel of repair parties stationed in general area

B. Training

1. Efficiency of dressing station depends on training of personnel
2. Officer in charge
 - a. Should be completely familiar with the ship, its battle bill, and the battle dressing station
 - b. Should be qualified in emergency lifesaving measures
 - (1) Will be required to treat casualties
 - (2) May have to assume responsibility for all shipboard medical care
 - (3) Will have to instruct his station's corpsmen in their duties
 - (4) Often required to instruct crew members in casualty care
3. Medical team
 - a. Knowledge of duties should be so thorough that performance is automatic
 - b. One assignment per man during action; for example:
 - (1) Surgical assistant
 - (2) Communications man

LESSON PLAN 2

- (3) Assistant casualty sorter
- (4) Repair party member
- c. Assignments should be rotated
 - (1) More closely knit teamwork is possible
 - (2) Essential work will not be hampered by absences when demands of each job are known
- d. Group responsibility to set up the emergency operating room for use in a short time

4. Crew

- a. Must be trained in casualty care
 - (1) For self-aid
 - (2) To aid their fallen shipmates during battle security
- b. Training is a continuing process to be undertaken by the officer in charge of the battle dressing station
 - (1) Establishes his leadership
 - (2) Influences the maintenance of order and high morale

III. Battle dressing station equipment

- A. Inventory: enough medical equipment and supplies to set up an emergency sick bay

(Show each item, explain its purpose, demonstrate its use. Pass small items around to students.)

- 1. Lockers containing complete surgical and orthopedic instrument kits, dressing bandages, drugs, blankets, etc.
- 2. Emergency operating table and accessories
- 3. Lavatory
- 4. Stretchers of several types
- 5. Emergency water tanks of adequate capacity

6. Hot water heater
7. Emergency operating lights
8. Sterilizers
9. Battle telephones
10. Miscellaneous equipment: gas masks, first aid kits

B. Responsibilities of the officer in charge

1. To familiarize himself with the equipment
2. To maintain complete stocks in a state of readiness
3. To be able to use equipment when necessary

IV. Operation of the station during battle

A. Manning the station

1. All assigned personnel report as soon as general quarters is sounded
2. Medical treatment team begins functioning

B. Casualty treatment

1. Dental and hospital corpsmen or crew members will give first aid to wounded prior to treatment at the station

2. Ambulatory patients

- a. Will arrive at station as commanding officer relaxes battle security

- b. Sorter should see that least wounded receive treatment as soon as possible

- c. Patients who can will return to battle stations immediately after treatment

(1) Maintain ship's battle efficiency

(2) Clear dressing station

LESSON PLAN 2

3. Badly wounded patients

a. Transported to station by the repair party

- (1) Examined thoroughly
- (2) Treated for hemorrhage, shock, and pain
- (3) Transferred to dressing stations under the supervision of medical officers for more definitive treatment during lulls in battle
- (4) Treated more specifically as soon as the ship leaves the battle zone

V. Operation of the station after battle

A. The officer in charge

1. Helps to sort patients
2. Applies dressings and bandages to lightly wounded
3. Transfers seriously wounded to main dressing stations where surgical and nursing care is available
4. Reexamines and, where necessary, replaces dressings, bandages, and splints previously applied
5. Supervises care of those wounded who remain at the station
6. Treats maxillofacial injuries
7. Remains at the disposal of the medical officer to render necessary assistance

B. Medical treatment team assists as necessary

VI. Station duties related to abandoning ship

- A. Preliminary training in casualty care and "abandon ship" drills preclude panic and confusion
- B. Officer in charge of the battle dressing station

LESSON PLAN 2

1. Supervises aid given by all hands to nonambulatory patients when ship is abandoned under condition A
2. Supervises the moving of nonambulatory patients to designated station for loading into boats and rafts under condition B

LESSON PLAN 3

TITLE: ESTABLISHMENT OF AIRWAY (Cricothyroidotomy)

OBJECTIVES

- I. To have the trainee learn the causes, symptoms, and signs of an obstructed airway
- II. To have the trainee learn and practice procedures for management of an obstructed airway
- III. To have the trainee learn precautions and practice procedures for an emergency cricothyroidotomy

TRAINING AIDS

- I. Facsimile neck, with extra "skins"
- II. Instruments: 13-gage needles, Abelson Cricothyrotomy needle, improvised instruments, scalpel, materials to keep the incision patent
- III. Film: Cricothyroidotomy (MN-7469). Color, sound, 8 minutes
- IV. Slides: to illustrate anatomic structures in the area of an obstructed airway
- V. Chalkboard, chalk, eraser

REFERENCES

- I. Janas, J. G.: Emergency tracheotomy in the dental practice. The Dental Students Magazine, pp. 19-22, May 1955
- II. Putney, F. J.: Complications and postoperative care after tracheotomy. A.M.A. Archives of Otolaryngology 62:272-6, Sept. 1955
- III. Scheer, H. M.: Foreign bodies in the food and air passages and emergency tracheotomy. Journal of Dental Medicine 4:3-7, Jan. 1949
- IV. Sheldon, C. H.; Pudenz, R. H.; Freshwater, D. B.: and Crue, B. L.: A new method for tracheotomy. Journal of Neurosurgery 12:428-31, July 1955

- V. Sicher, H.: Oral Anatomy, ed. 2. St. Louis: C. V. Mosby, 1952
- VI. Ulin, A. W. and Rosamoff, H. L.: Management of airway in acute head injury. A.M.A. Archives of Surgery 67:756-60, Nov. 1953

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. Emergency situations dramatize the need for personnel trained in the management of obstructed airways
 - 1. Children swallow small objects
 - 2. Food lodges in the throat
 - 3. Accidental injuries cause airway obstruction
 - 4. Major disasters may have as a result many casualties with obstructed airways
 - B. Establishment of an airway before the heart stops beating may save a life

PRESENTATION

- I. Causes of an obstructed airway
 - A. Foreign bodies
 - B. Tracheobronchial secretions
 - C. Laryngospasm
 - D. Glottic edema
 - E. Cervical emphysema
 - F. Paralysis
 - G. Spasm of vocal cords

LESSON PLAN 3

H. Trauma

II. Indications of an obstructed airway

- A. Obvious injury to the face or neck
- B. Dyspnea: difficult or labored breathing
 - 1. Terrified expression
 - 2. Frantic, clawing movements
 - 3. Strained neck muscles
- C. Dysphonia: any impairment of voice
- D. Grayish color of the skin
- E. Cyanosis of lips, fingernail beds, and ear lobes
- F. Depressed supraclavicular fossae
- G. Depressed jugular notch
- H. Depressed rib interspaces
- I. Conditions F, G, and H accentuated upon inspiration

III. Differential diagnosis of obstructed airway and systemic respiratory arrest

- A. Symptoms D and E common to both
- B. Conditions F, G, and H peculiar to obstructed airway
 - 1. Lungs are straining, causing depressions
 - 2. When systemic respiratory arrest occurs there are no depressions
 - a. Airway is open
 - b. Pressure in lungs and on body surface is normal
- C. Treatment for two conditions differs
 - 1. Obstructed airway must be opened
 - 2. Systemic respiratory arrest demands resuscitation

IV. Immediate procedure for opening an obstructed airway

A. Examine to determine cause of obstruction

(Show appropriate slides.)

1. Laryngoscopic

- a. Make a rapid, thorough laryngoscopic examination of laryngeal part of the pharynx
- b. If laryngoscope is unavailable, use improvised instrument

2. Digital

- a. Quickly protract the tongue as far as possible
- b. Explore space between base of tongue and laryngeal opening
 - (1) Hold tip of tongue with gauze or handkerchief
 - (2) Probe pharynx with index finger of free hand
- c. Remove obstruction with fingers or improvised instrument

B. Percuss if object is firmly lodged

1. If patient's condition permits and help is available,
 - a. Steeply elevate the torso
 - b. Sharply percuss the back
2. Object may be jolted out or dislodged by a forceful gust of air from the lungs

C. If above procedures fail, quick surgical action is necessary to save the patient

V. Surgical procedures for managing an obstructed airway

A. Low tracheotomy

LESSON PLAN 3

1. Common elective procedure accomplished in operating room
2. Superficial transverse incision made below isthmus of the thyroid
3. Longitudinal incision then made through tracheal rings

B. High tracheotomy

1. Performed under only the most exceptional circumstances
 - a. Danger of laryngeal stenosis
 - b. Should be revised as soon as possible
2. Major part of incision above the isthmus of the thyroid

C. Cricothyroidotomy

1. Transverse incision into the cricothyroid space
2. Method of choice for field level emergency casualty treatment
 - a. Easier to teach than tracheotomies
 - b. Can be performed unassisted
 - c. Requires no anesthetic
 - d. Presents a minimum hemorrhage problem
 - e. Few instruments necessary to make incision and keep it patent
 - f. Anatomically safe
 - g. Less training and experience necessary to perform the operation
3. Circumstances
 - a. Performed when tracheotomies are not feasible because of lack of facilities or trained personnel

- b. Not intended to take the place of operating room procedures

(Show appropriate slide; point out each part named.)

4. Review of anatomic situation

- a. Principal structures in the area identified on the slide
- b. No major blood vessels in the area immediately surrounding the cricothyroid space
 - (1) Hemorrhage usually can be controlled by pressure
 - (2) Large blood vessels, nerves, and glands are not disturbed when cricothyroidotomy is performed correctly

(Show appropriate slides.)

5. Cricothyroidotomy procedure

- a. Place patient in supine position
 - (1) Body straight
 - (2) Shoulders elevated
 - (3) Neck extended
- b. Locate thyroid space
 - (1) Carefully determine the midline of the neck
 - (2) Visualize a straight line drawn from the middle of the chin (symphysis), through the middle of the thyroid cartilage (Adam's apple), through the middle of the jugular notch
 - (3) Palpate from the chin to the thyroid cartilage and down to the first transverse notch below
 - (4) Almond-shaped notch is the cricothyroid space into which the airway will be opened
- c. Make incision
 - (1) Control patient with one hand

LESSON PLAN 3

- (2) Grasp knife blade with free hand
 - (a) Between thumb and forefinger
 - (b) Limit length; no more than $1/4$ to $1/2$ inch of blade should protrude
 - (3) Use forefinger to guide blade to crico-thyroid space
 - (4) Thrust blade into space and remove
 - (5) Insert blade handle into incision and turn 90°
 - (a) Provides immediate exchange of air
 - (b) Holds incision open until it can be made patent
- d. Effect patency
- (1) Extend opening laterally with blade to allow insertion of device
 - (2) Insert device into opening
 - (a) Plastic or rubber tube
 - (b) Any other instrument which will fit: hemostat, scissors, glasses frames
 - (3) Secure device firmly with tape or best available substitute
- e. PRECAUTIONS
- (1) Make sure the appliance holding the incision open is clean and in proper position
 - (2) Stay with the patient until the obstruction is removed or elective procedure is undertaken
 - (3) Do NOT keep the incision open more than 24 hours or damage to the vocal cords may result

APPLICATION

I. Instructor's demonstration

- A. Use facsimile neck to demonstrate the procedure outlined for cricothyroidotomy
 - 1. Divide into steps in accordance with outline
 - 2. Emphasize important points at each step
- B. Exhibit and explain instruments used to perform cricothyroidotomy
 - 1. 13-gage needle
 - 2. Abelson Cricothyrotomy needle

II. Trainees' practice

- A. During lecture period
 - 1. Have each trainee locate the cricothyroid space on at least two other trainees and mark it with a skin marking pencil
 - 2. Check to make sure space has been located and marked correctly in each instance
- B. During laboratory period
 - 1. Have each trainee perform cricothyroidotomy several times on the facsimile neck until you are certain he can do it correctly
 - 2. Question the trainee on various points of the procedure
 - 3. Repair or replace "skin" after each trainee's performance

III. Show training film, "Cricothyroidotomy" (Prepare film and projector in advance)

IV. Conduct question and answer period if time permits after trainee practice

LESSON PLAN 4

TITLE: CONTROL OF HEMORRHAGE

OBJECTIVES

- I. To develop the trainee's knowledge of ways to control different types of hemorrhage
- II. To give the trainee practice in hemorrhage control

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Facsimile abdomen and moulages
- III. Materials for ligation
 - A. Hemostats
 - B. Sponges
 - C. Scalpel
 - D. Sutures, suture scissors
- IV. Materials for tourniquets
- V. Battle dressings, all sizes
- VI. Film: First Aid for Bleeding (MN-8182). Color, sound, 21 minutes

REFERENCES

- I. Bowers, W. F. (ed.): Surgery of Trauma. Philadelphia: J. B. Lippincott Co., 1953
- II. National Research Council, Committee on Surgery: Burns, Shock, Wound Healing, and Vascular Injuries. Philadelphia: W. B. Saunders Co., 1943

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson

III. Explain importance of subject

- A. Adequate blood volume is essential for life and must be conserved
- B. Average adult body contains about 5 quarts of blood
- C. Loss of half the blood volume may be fatal

PRESENTATION

I. Immediate procedure to control hemorrhage

- A. Apply hand pressure
 - 1. Directly over or above the wound
 - 2. At applicable pressure point if known
- B. Elevate the injured part
- C. Maintain pressure
 - 1. Until material for more adequate control can be reached
 - 2. Until help arrives
- D. Prompt action may save life

II. Venous hemorrhage

- A. Steady flow of dark red blood
- B. Continuation causes dangerous loss of blood volume
- C. To control
 - 1. Firmly apply pressure bandage, preferably one with sterile compress, to the wound
 - 2. Elevate the injured part if possible
 - 3. Keep patient quiet
 - a. Treat to prevent shock
 - b. Treat for shock if necessary

LESSON PLAN 4

III. Capillary hemorrhage

- A. Continuous oozing of bright red blood
- B. Control by applying pressure bandage

IV. Arterial hemorrhage

- A. Spurts or steady flow of bright red blood
- B. Presents the greatest control problem
- C. To control

1. Use pressure bandage if possible

- a. Place large compress over the wound
- b. Secure compress with firmly placed bandage
 - (1) Both should extend well past the edges of the wound
 - (2) Not so tight as to create tourniquet effect
- c. Battle dressing makes excellent pressure bandage
 - (1) Combination of bandage ties and compress
 - (2) Available in three sizes
- d. Check pressure bandage periodically
 - (1) To determine if there is blood seepage
 - (2) To be sure no blood is flowing through or around the bandage edges

2. Use tourniquet if pressure bandage is ineffective

- a. Web-type
- b. Place as near the wound as possible
- c. Tighten until arterial flow stops; NO TIGHTER

- (1) Too tight a tourniquet damages structures beneath it
- (2) Too loose a tourniquet may increase venous blood loss
- d. Guard against unnecessary loss of limb
 - (1) Make certain the tourniquet can be seen easily
 - (2) Note time applied on casualty tag or on tag attached to tourniquet
- e. Leave secure until hemorrhage can be controlled by other means and blood volume can be restored
 - (1) May be left in place safely for 2 or 3 hours when properly applied
 - (2) May be left for a longer time in cold weather
- f. Use only when other means for hemorrhage control fail
- g. Indications for use of a tourniquet
 - (1) Traumatic amputation
 - (2) Arterial hemorrhage associated with open fracture

V. Other methods for hemorrhage control

A. Ligatures and hemostats

- 1. To control arterial and venous hemorrhage
 - a. When no other means is adequate
 - b. By personnel with proper training and medical background only

LESSON PLAN 4

2. Indications for use

- a. Scalp wounds with skull fractures in the immediate area
- b. Hemorrhage from large vessels in areas where pressure is ineffective
- c. Wounds where a tourniquet cannot be applied

B. Sterile gauze packing

1. May be covered with a pressure bandage
2. Note clearly on patient the time applied
3. Check circulation regularly

VI. PRECAUTIONS

- A. Take care not to injure circulatory vessels or interrupt collateral circulation during hemorrhage control
- B. Evacuate patient by stretcher; handle gently to avoid reinducing hemorrhage
- C. Keep patient warm; treat for shock

APPLICATION

I. Instructor's demonstration

- A. Use manikin to demonstrate control
 1. At pressure points
 2. By pressure bandage
 - a. Venous hemorrhage
 - b. Arterial hemorrhage
 3. By tourniquet
- B. Use facsimile abdomen to demonstrate arterial and venous hemorrhage control by ligature

II. Trainees' practice

A. Use moulages and facsimile abdomen

1. Hemorrhage control by methods demonstrated
2. Instructor should correct any errors

B. Answer instructor's questions on reasons for procedures

III. Show training film, "First Aid for Bleeding"
(Prepare film and projector in advance)

LESSON PLAN 5

TITLE: CASUALTY TREATMENT OF SHOCK

OBJECTIVES

- I. To develop the trainee's understanding of the nature and etiology of primary and secondary shock
- II. To develop the trainee's ability to recognize primary and secondary shock syndromes
- III. To add to the trainee's knowledge of etiologic factors requiring special consideration
- IV. To familiarize the trainee with emergency procedures for treating various types of shock

TRAINING AIDS

Film: First Aid in the Prevention of Shock (MA-9188).
Black and white, sound, 26 minutes

REFERENCES

- I. Conference on Shock and Circulatory Homeostasis.
New York: Josiah Macy, Jr., Foundation, 1952
- II. Medical Research Council (Great Britain): The Treatment of "Wound Shock," War Memorandum No. 1, ed. 2.
London: H.M. Stationery Office, 1952
- III. Moon, H. V.: Shock,--Its Dynamics, Occurrence, and Management. Philadelphia: Lea and Febiger, 1942
- IV. National Research Council, Committee on Surgery: Burns, Shock, Wound Healing, and Vascular Injuries.
Philadelphia: W. B. Saunders Co., 1943
- V. National Research Council, Division of Medical Sciences: Report of Blast Injuries. Washington: U. S. Government Printing Office, 1943

- VI. Scudder, J.: Shock Syndrome. Annals of the New York Academy of Sciences, vol.55, art.3. New York: The Academy, 1952
- VII. U. S. Office of Civil Defense: The Clinical Recognition and Treatment of Shock, pub. 2212. Washington: U. S. Government Printing Office, 1943
- VIII. Wiggers, C. J.: Physiology of Shock. New York: Commonwealth Fund, 1950

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. The condition known as shock commonly follows injury
 - B. Shock is a boundary between life and death
 - C. Taking prompt measures to reverse the progress of shock may preserve life

PRESENTATION

- I. Nature of shock
 - A. Definition: depression of the physical and mental processes of the body
 - B. Actual and potential incidence
 - 1. So wide that most careful consideration is demanded
 - 2. May follow any sudden severe upset of psychologic and physiologic processes
 - a. Accidents
 - b. Natural disasters
 - c. Modern warfare

LESSON PLAN 5

- (1) Trend is to use increasingly destructive weapons
- (2) Number of casualties is greatly multiplied
- (3) Problem of treating shock is enormously magnified

II. Treatment of shock

A. Prevention is preferred

- 1. Give prophylactic care to patients suffering possible shock-producing injuries
- 2. Do not defer treatment until appearance of shock syndrome

B. General procedures to prevent or reverse shock

- 1. Place patient in shock position
 - a. Supine, legs elevated about 6 inches
 - (1) When practical
 - (2) If wound state permits
 - b. Constitutes important part of treatment
 - (1) Assures return of blood pooled in extremities
 - (2) Permits adequate cardiac function
 - (3) Roughly equal to a 500 cc. blood transfusion
 - c. Exaggeration of desirable position is not indicated
- 2. Conserve and maintain body heat; DO NOT INCREASE IT
 - a. Encourage peripheral vasoconstriction
 - (1) Accompanies shock

- (2) Compensates for reduced circulating blood volume
 - (a) Prevents anoxia
 - (b) Assures adequate blood supply to heart
- b. Excessive heat produces peripheral vasodilation
 - (1) Reverses constricting mechanism
 - (2) Endangers life
- 3. Relieve pain, a major cause of shock
 - a. By mechanical means, preferably; reposition casualty
 - b. By the use of drugs if necessary
 - (1) CAUTION: do not regard drugs as panaceas
 - (a) Reactions mistakenly attributed to pain may be caused by other conditions
 - (b) Uncommunicative patient may be restless due to thirst, anoxia, or full bladder
 - (2) Disadvantages
 - (a) Morphine, 1/8-1/6 gr., intravenously
 - 1. Has strong tendency to mask head injuries
 - 2. May induce nausea, vomiting; loss of body fluids
 - (b) Barbiturates
 - 1. Depress the central nervous system
 - 2. May increase shock-associated hypoxia

LESSON PLAN 5

C. Specific emergency treatment

1. Primary shock

a. Apparently innocuous consequence of disaster

- (1) Frequently occurs in victim
- (2) Occasionally affects onlookers

b. Early reversal is vital: neglect may foster more serious secondary shock

c. Etiology

- (1) Psychic or neurogenic disturbance
- (2) Slight injury
- (3) Fright
- (4) Horror

d. Syndrome

- (1) Loss of consciousness
- (2) Profuse perspiration
- (3) Cool, moist skin
- (4) Pallor
- (5) Agitation
- (6) Decreased blood pressure level
- (7) Increased pulse rate

e. Procedure

(1) Simple measures usually suffice

- (a) Follow general procedures previously outlined
- (b) Stabilize circulation by administering stimulants

1. Aromatic spirits of ammonia

2. Ephedrine

3. Metrazol

(c) Patients with severe psychic overlay and hysteria may benefit from long, barbiturate-induced sleep

(2) Never neglect primary shock if time permits its care

(a) Unaided recovery is usual

(b) Secondary shock may supervene, particularly when there is prolonged syncope

(3) Transfuse whole blood or plasma volume expanders in stubborn cases

2. Secondary Shock

a. Late in onset

b. Insidious in development

c. Etiology

(1) Loss of effective circulating blood volume

(a) Initially accompanied by compensating peripheral vasoconstriction

1. Anoxia, lack of aerated blood, causes damage to kidneys and brain

2. Extravascular fluid loss further reduces circulating blood volume

3. Blood pressure drops

a. Cardiac output decreases

b. Venous return diminishes

c. Peripheral circulation becomes more inadequate

LESSON PLAN 5

d. Blood supply to tissues is impaired

e. Chain of events terminates in death

- (2) May follow any serious injury, hemorrhage, trauma, burns, blast asphyxia, or untreated primary shock
- (3) Aggravated by combinations of causative factors
- (4) Encouraged by dehydration, fatigue, acidosis, pain, fear, and exposure
- (5) Seriousness or mortality probably will be in direct proportion to nature and extent of injury

d. Syndrome

- (1) Evident symptoms of primary shock
- (2) Weakness
- (3) Subnormal temperature
- (4) Thirst, restlessness, apprehension
- (5) Premonitions of impending death

e. Procedure

- (1) Begin active treatment as soon as possible
- (2) Replace lost blood with whole blood or plasma volume expander
 - (a) Accomplish other necessary emergency measures concomitantly
 - 1. Arrest hemorrhage
 - 2. Relieve pain
 - 3. Debride necrotic tissue
 - (b) Avoid temporization or delay

D. Shock states which present special problems

1. Hemorrhagic shock

a. Etiology: loss of blood

b. Treatment

(1) Stanch hemorrhage

(2) Transfuse whole blood and plasma volume expanders

(3) Prevent tissue anoxia and toxemia for good prognosis

2. Traumatic shock and crush syndrome

a. Exact mechanism not clearly understood

b. No serious blood loss; hemorrhage may be minor or nonexistent

c. Etiology: tissue necrosis

(1) Massive destruction as a result of missile action

(2) Interrupted circulation as when movement is restricted

(3) Venous return circulates resulting toxic products

(4) Irreparable damage may occur

(a) Uremia

(b) Lower nephron nephrosis

d. Possible etiologic factors

(1) Local effect of toxin from muscle damage

(2) Intravascular hemolysins

(3) Prolonged kidney ischemia due to reflex renal spasms

(4) Formation of casts of insoluble muscle pigment in the tubuli of the kidneys

LESSON PLAN 5

e. Treatment

- (1) No effective means is known
- (2) Expectant procedure
 - (a) Transfuse whole blood and plasma volume expanders
 - (b) Add alkaline, such as sodium bicarbonate, to the diet
 1. For 24 hours
 2. Enough to turn litmus paper blue in the urine

3. Burn shock

a. Etiology: continuous loss of body fluids

- (1) Initial, simultaneous injuries
 - (a) Loss of red blood cells due to heat
 - (b) Tissue damage compatible with size and degree of the burn
- (2) Subsequent loss of serum and plasma
 - (a) Reduces the effective circulating blood volume
 - (b) Causes hemoconcentration
- (3) Constant absorption of toxicants from the destroyed tissues

b. To prevent or reverse

- (1) Administer whole blood early
 - (a) Restores circulating blood volume
 - (b) Replaces damaged red blood cells
- (2) Care for wounds (see lecture on Burns)
- (3) Follow blood transfusions with infusion of plasma volume expanders
 - (a) Supports circulating blood volume

(b) Does not increase hemoconcentration

4. Shock from blast injuries

a. Etiology: subjection to sudden, violent movement of air or water

b. Syndrome

(1) Air blast

(a) Parenchymal lung hemorrhage caused by traumatic rib action

1. Hemoptysis

2. Atelectasis

3. Gross bronchial rales

4. Spontaneous pneumothorax

(b) Pulmonary edema and reduced vital capacity

1. Anoxia

2. Loss of effective circulating blood volume

(2) Immersion blast

(a) Injuries generally confined to abdominal cavity

(b) Possible rupture of abdominal organs or viscera

c. Treatment

(1) Diagnosis may present difficult problems

(a) Do not ignore anyone in the vicinity of a blast because he has no detectable wound

(b) Follow general procedures for shock treatment

(c) Give transfusions with care

LESSON PLAN 5

1. Overtransfusion of fluids, especially saline solutions, may increase any pulmonary edema present
2. Concentrated solutions of red cells and plasma volume expanders help to remove some fluid from the lungs
3. Supplement with oxygen under pressure for optimum blood aeration

(d) Administer antibiotics early

1. To prevent pneumonia
2. To reduce danger from peritonitis

(e) Sedate cough as it develops

(f) Be alert for acute abdominal injuries; their presence constitutes a surgical emergency

III. Shocklike conditions which do not respond well to normal shock treatment

A. Damage to the central nervous system

1. May produce any or all symptoms usually associated with shock
2. True symptoms revealed under field conditions by malfunctioning of the following
 - a. Reflexes
 - b. Cranial nerve functions
 - c. Pupils and eye movements
3. Skull fracture may be detected by examining ears and nose for signs of hemorrhage

B. Toxic gas poisoning

1. Symptoms

- a. Shocklike state which does not respond to treatment
 - b. Pulmonary edema
 - c. Signs of intracranial changes
- 2. Treatment: administer oxygen under pressure
- C. Reflex paralysis, battle exhaustion, and shock psychosis
 - 1. May respond well initially to shock therapy
 - 2. Casualties later become serious behavior problems
 - 3. Evacuate as soon as possible for psychiatric care
 - a. To prevent deleterious effects on other patients
 - b. To prevent further emotional trauma
- D. Any combination of the described injuries is possible
 - 1. Casualty with flash burns may also suffer blast injury or gas poisoning
 - 2. This complicates the task of the individual rendering early treatment
- IV. Summarized guide to the successful treatment of shock
 - A. Prevent it
 - B. Treat it early
 - 1. Place in shock position
 - 2. Maintain body temperature
 - 3. Relieve pain
 - 4. Control hemorrhage
 - 5. Transfuse whole blood or plasma volume expanders
 - 6. Immobilize fractures

LESSON PLAN 5

C. Treat it late

1. Evacuate patient for definitive treatment
2. Prevent secondary infection
3. Prevent urinary complications
 - a. Administer alkalines
 - b. Relieve anoxia
 - c. Give supportive treatment to prevent dehydration

D. Treat it always

1. Never neglect any kind of shock
2. Be alert for late or recurrent shock

APPLICATION

Show training film, "First Aid in the Prevention of Shock"
(Prepare film and projector in advance)

TITLE: WOUND BALLISTICS, DEBRIDEMENT, AND CLOSURE

OBJECTIVES

- I. To introduce to the trainee the basic principles of wound ballistics
- II. To instruct the trainee in the principles of wound debridement and closure
- III. To provide laboratory training in wound debridement and closure

TRAINING AIDS

- I. Felt suture board, fabricated or supplied locally
- II. Chalkboard, chalk, erasers
- III. Film (U. S. Army): Debridement, Part 2, "Wounds of the Extremities" (PMF 5305). Color, sound, 33 minutes

REFERENCES

- I. National Research Council, Committee on Surgery: Burns, Shock, Wound Healing, and Vascular Injuries. Philadelphia: W. B. Saunders Co., 1943
- II. Silliphant, W. M. and Beyer, J. C.: Wound Ballistics. Military Medicine 117:247, Sept. 1955

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. A large percentage of the surgery done in mass casualty situations will consist of wound debridement and closure

LESSON PLAN 6

- B. Because of his basic knowledge, digital skill, and previous experience with debridement instruments, the dental officer is expected to perform this minor surgery well, particularly if wounds occur in the facial regions
- C. A fundamental understanding of wound ballistics and the technique and rationale of debridement will further the preservation of life and limb in event of emergency

PRESENTATION

I. Wound ballistics: science dealing with the motions of projectiles and their role in wound production

A. Wounding agents

1. Origin

a. High speed

- (1) Rifle or machinegun projectiles
- (2) Fragments of bombs or shells detonated at close range
- (3) Pistol or submachinegun bullets fired at close range

b. Low speed

- (1) Spent rifle or machinegun projectiles
- (2) Fragments of distantly detonated bombs or shells
- (3) Pistol and submachinegun bullets fired at normal combat distances
- (4) Most grenade, mine, mortar, and fragmentation missiles

(5) Blast debris

2. Physical properties

a. Velocity

- (1) Initially imparted by projecting weapon
- (2) Reduced at a rate determined by projectile weight and size

b. Stability

- (1) "True" flight of airborne projectile is rarely duplicated within body tissues
- (2) Instability of projectile greatly influences nature and extent of wound

c. Mechanical cohesiveness

- (1) Soft- or hollow-nosed projectiles have increased wounding power
- (2) Fragmenting projectiles increase wound severity

B. Wound production

1. Missiles destroy tissue in proportion to

a. Speed

- (1) Higher velocities cause more tissue damage
- (2) Greater amount of kinetic energy transferred

b. Weight, shape, and size

(1) Heavier missiles

- (a) Lose speed more slowly
- (b) Contact more tissue
- (c) Often perforate tissues
- (d) Cause more tissue damage than light ones

LESSON PLAN 6

(2) Irregularly shaped missiles

(a) Lose speed rapidly

(b) Often penetrate tissue and remain

(c) Cause more tissue damage than smooth missiles

(3) Size: The greater the size, the greater the damage

c. Tissue resistance

(1) Elasticity of skin

(2) Resistance of internal tissue to disruptive force

(3) The greater the mass of tissue, the greater the damage

(4) Missiles striking bone create more missiles of the shattered bone

2. Greater destruction of tissue necessitates more radical debridement procedures

II. Wound debridement

A. Types of wounds requiring debridement

1. Penetrating

a. Disrupted skin

b. Wound of entry only

2. Perforating

a. Disrupted skin

b. Entrance and exit wounds

3. Mutilating

a. Gross disfiguration

b. Traumatic amputation sometimes present

B. Initial considerations

1. Blood supply potentially available

- a. Adequate supply decreases the danger of infection (tetanus, gas, gangrene)
- b. Many supply sources in the head and face
- c. A few main vessels supply the extremities
- d. The greater the blood supply, the less need for debridement
- e. The poorer the blood supply, the greater need for debridement

2. Musculature

- a. Extremities possess deep, heavy areas of muscle
- b. Head and face have little depth of tissue except for the brain
- c. Head and face injuries generally require less debridement than others

3. Specialized tissues: mucosa, nerve, bone, gland ducts

- a. Destruction generally interferes with function of the part or organism as a whole
- b. Careful debridement provides best opportunity for survival with least disfigurement and disability

4. Salivary organs

a. Glands

(1) Usually recover well

(a) When ductile structures remain nearly intact

(b) Fistulas which frequently develop usually close after conservative measures

LESSON PLAN 6

(2) Do not remove unless damage is extreme

b. Ducts

(1) Improper initial care can result in accidental burial of a severed duct

(a) Permits discharge of saliva into the tissues

(b) Fluids form large pools

1. Dissect tissue layers

2. Eventually form fistulas or sinus tracts outside the mouth

(2) To avoid more difficult problems

(a) If severed duct can be located, free it and lead it into the mouth

(b) If severed duct cannot be located

1. Extirpate gland

2. Deactivate gland by radiation

(c) If damaged duct cannot be joined or exteriorized, ligate; blocked gland will atrophy

5. Bone

a. Conserve whenever possible

(1) Comminuted, contaminated, or detached bone formerly removed routinely because of infection probability

(2) Loss of bone substance presents problem in immobilization and reconstruction

(3) Antibiotics now make free grafts possible

b. Clean and replace, PROVIDED IT CAN BE COVERED COMPLETELY WITH VITAL TISSUE

6. Mucous membrane
 - a. Debride conservatively
 - b. Remove only hopelessly crushed and lacerated substance
 - (1) Blood supply generally good; recovery ability high
 - (2) Lack of good donor sites makes replacement difficult
 7. Teeth
 - a. When practical, remove from lines of fracture
 - b. Delay removal
 - (1) If roots or teeth in fragments of fractured jawbone are sole means of managing those fragments
 - (2) If removal would tend to detach the fragment from soft tissues remaining
 - c. When possible, search for tooth fragments embedded in soft tissue
 - (1) Strong potential source of infection
 - (2) May produce severe reaction of fibrous tissues
 - (a) Heavy scars
 - (b) Adhesions
 8. Preserve specialized structures whenever possible
- C. Procedure
1. Prepare surrounding skin
 - a. Shave wide margin

LESSON PLAN 6

- b. Scrub carefully with soap and water
- c. Paint with antiseptic
- 2. Incise
 - a. Skin and fascia above and below wound
 - b. Open wound to depths; retract muscles for clear visualization of debridement field
 - c. Counterincise large wound if necessary to provide dependent drainage
- 3. Explore with finger to determine extent of damage
 - a. Remove foreign bodies
 - (1) Essential to good cosmetic results and freedom from infection
 - (2) Gentle irrigation with normal saline solution may help wash out sand, dirt, and debris
 - b. Free of blood clots, accumulations of serum and exudate
- 4. Excise ALL nonvital tissue with care
 - a. Skin
 - (1) Trim frayed, crushed edges back to where bleeding starts or gross discoloration ends
 - (2) Usually can be replaced from elsewhere
 - b. Fascia and fat
 - (1) Contaminated or damaged fat tends to necrose; remove any which protrudes
 - (2) Fascia survives well; conserve for future use in closure when possible

c. Muscle

- (1) Trim back to where bleeding starts or gross discoloration ends
- (2) Devitalized muscle tissue contributes to breakdown of closure, shock-producing toxemia, and gangrene

5. Avoid damaging blood supply, nerves, other vital structures

6. Prepare most soft tissue wounds for delayed primary closure

a. Ligate bleeding points

b. Leave skin and subcutaneous tissue unsutured

- (1) Primary healing will determine time of closure

- (2) Usually closed within 7 days

c. Dress wound to protect vital tissues

- (1) Lay sterile, fine mesh vaseline gauze or parachute silk between walls of wound

- (2) Pack LOOSELY with fluffed gauze

- (3) Place nonconstricting protective dressing on surface

7. Immobilize and slightly elevate injured part

8. Suture when conditions indicate

III. Immediate wound closure

A. Management of choice for maxillofacial wounds, sucking chest wounds, hand and head injuries

B. Done as soon after injury as possible

- 1. Cleanse and prepare surrounding area

LESSON PLAN 6

2. Excise, "economically" when debriding devitalized tissues of face, head, and hand
3. Control bleeding
4. Suture
 - a. Muscle fibers
 - (1) End to end in normal anatomic position
 - (2) Reattach to bone where possible
 - (3) Use absorbable suture
 - b. Fascia and fat
 - (1) Close in layers as accurately as possible
 - (2) "Borrow" layers to aid in adequate closure where tissue has been lost
 - c. Mucous membrane where necessary to isolate the oral cavity in wounds of the face
 - d. Skin
 - (1) Plan closure pattern
 - (2) Outline flaps with sterile skin pencil or gentian violet
 - (3) Cut to full thickness with sharp knife
 - (a) Perpendicular to surface
 - (b) As even and straight as possible
 - (4) Undermine complete thickness of edges and flaps to permit closure without tension
 - (5) Preserve blood supply by leaving broad bases to all flaps
 - (6) Close subcutaneous tissue with absorbable sutures

- (7) Approximate flaps with absorbable trial subcuticular sutures, tying knots downward
- (8) When approximation is satisfactory, close with nonabsorbable sutures
 - (a) Fine material, closely spaced
 - (b) Tie to one side of wound
- (9) Use as little tension as possible; employ retention-type sutures, vertical or horizontal mattress, when tension is necessary
- (10) If the defect cannot be closed with skin available
 - (a) Leave partially open where tension occurs
 - (b) Dress with sterile, fine mesh vaseline gauze or parachute silk
 - (c) Await granulation tissue formation
 1. Skin can then be undermined and wound closed
 2. Graft can be used to cover if necessary
- e. Immobilize region by use of a pressure bandage
- f. Reduce underlying fractures
- g. Provide adequate drainage
5. Do not jeopardize success of case management by attempting to obtain perfect cosmetic results following serious wounding
 - a. Elaborate immediate pedicle flaps and revisions frequently fail
 - (1) Wounds are essentially contaminated

LESSON PLAN 6

- (2) Additional tissue loss, drainage, and suppuration are the rule rather than the exception
- b. Return the tissues to as near normal position as possible with future revision in mind
 - (1) Secondary closure
 - (2) Correction of defects
- c. In mass casualty situations, hemorrhage control, treatment of shock, and provision of airway are of primary importance; definitive treatment frequently must wait

APPLICATION

- I. Instructor's demonstration
- II. Trainees' practice: debridement and closure procedures, using felt suture board
- III. Film showing: prepare projector and film in advance

TITLE: DRESSINGS AND SPLINTS

OBJECTIVES

- I. To define for the trainee the terms "dressing" and "splint"
- II. To teach the trainee the types and uses of dressings and splints
- III. To give the trainee practice in the application of dressings and splints

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Assorted battle dressing packets
- III. Bandages, and materials for improvised bandages
- IV. Traction splints, coaptation splints
- V. Various materials for improvised splints
- VI. Chalkboard, chalk, erasers
- VII. Film: Bandaging for Hospital Corpsmen (MN-9319, A-Q). Black and white, silent, 21 minutes total

REFERENCES

- I. American National Red Cross: First Aid Textbook, ed. 4. Garden City, New York: Doubleday and Company, Inc., 1957
- II. Handbook of the Hospital Corps, United States Navy (NAVMED P-5004). Washington: U. S. Government Printing Office

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject

LESSON PLAN 7

- A. "Wounds must be covered" is a fundamental maxim in the treatment of most injuries
- B. Many cases of fracture can be expected as a result of modern warfare methods
- C. Correct splinting plays an important role in the control of shock and prevention of permanent disability

PRESENTATION

I. Wound dressing

- A. Definition: any material used to cover or dress a wound
- B. Purposes
 - 1. Hemorrhage control
 - 2. Prevention of further wound contamination
 - 3. Prevention of further injury to wound
- C. Types
 - 1. Aseptic: sterile
 - 2. Antiseptic: germicidal
 - 3. Wet: kept moist with sterile saline or antiseptic solution
 - 4. Dry sterile: for wounds assumed to be uncontaminated and uninfected
- D. Components: the compress and the bandage
 - 1. The compress
 - a. Definition: a pad of sterile material placed next to the wound surface
 - b. General use: protection of wound surface

c. Special uses

(1) To re-establish airtight integrity of chest wall

(a) Tape sterile gauze to place over wound

(b) Cover with a piece of rubber dam or cellophane and seal down with tape and/or bandage

(2) To cover abdominal wound and any protruding viscera

(a) Large dressing with attached bandages supplied in field kit is ideal

(b) Any sterile gauze dressing will suffice

(c) Procedure

1. Moisten with any available sterile solution and apply

2. Secure with tape, scultetus binder, or Montgomery straps

3. Provide minimal care at casualty level

4. NEVER ATTEMPT TO MANIPULATE VISCERA

(3) To cover burned area

(a) Treat first for pain and shock

(b) Avoid contamination, area usually is sterile

(c) Use sterile technique to remove charred material and clothing from burned area

LESSON PLAN 7

2. The bandage

a. Definition: any material used to keep the compress in place

- (1) Neat, properly applied bandage indicates presence of correctly applied compress
- (2) Comfort and well-being of patient often depend upon proper application

b. Types and uses

(1) Triangular

(a) Made by cutting a 36- to 40-inch square of material diagonally

(b) Uses

1. To secure dressings over large areas of the body
2. As sling for arm or collarbone
3. To secure splints

(2) Cravat

(a) Made by bringing point of triangular bandage to middle of its base and continuing to fold to desired width

(b) Uses

1. To secure dressings on the cranium, eye, elbow, knee, arm, forearm, leg, or thigh
2. In conjunction with the patient's shoe, to support strained or sprained ankle

(3) Roller

(a) Long strip of material wound cylindrically

(b) Used on almost any portion of the body

1. To secure dressings and splints
2. To immobilize fractures
3. To support injured joints

(4) Barton

(a) Made from roller bandage

(b) Uses are of special interest to dental officer

1. To support fractured mandible
2. To hold dressings on chin

(c) Can be improvised from Navy man's "white hat"

1. Cut part way around brim
2. Swing brim under chin like strap

c. Means to secure the bandage

(1) Square knot

(a) Simple, neat, quick

(b) Easily untied by "tripping" and sliding apart

(2) Adhesive or cellulose tape

(3) Safety pins

(4) Collodion

E. May be prepared and stored or improvised when needed

1. Prepared dressings

LESSON PLAN 7

a. Sealed wound dressing packet

- (1) Sterile gauze compress with attached bandage
- (2) Supplied in 3 sizes to all armed services medical units
 - (a) In hermetically sealed covering
 - (b) Designed to be used without destroying sterility of compress

b. Universal Protective Dressing

- (1) Primarily for burns
- (2) Approved by National Research Council
- (3) Components
 - (a) Inner layer: fine mesh gauze
 - (b) 1 inch of absorbent cotton
 - (c) Many layers of nonabsorbent cellulose
 - (d) Moisture repellent outer layer: prevents contamination even when dressing is saturated with exudate
- (4) Sizes
 - (a) 22 x 36 inches
 - (b) 22 x 18 inches
- (5) Advantages
 - (a) Easy, rapid application
 - (b) Can be stockpiled for civilian use in event of disaster
 1. Presterilized
 2. Packaged in waterproof plastic

c. Gauze dressings

- (1) Familiar to all dental officers and technicians
- (2) Used to arrest hemorrhage during operative procedures
- (3) May be cut and folded to size
 - (a) From roll of gauze
 - (b) From roller bandages

2. Improvised dressings

- a. CLEAN toweling, handkerchiefs, sheets, etc.
- b. Less conventional materials used in extreme emergencies

- (1) Cardboard
- (2) Cellophane

c. PRECAUTIONS

- (1) Sterilize if possible
 - (a) Flame over match, gas flame, or open fire
 - (b) Scorch with hot iron
- (2) Avoid further wound contamination by following general rules for treatment
- (3) Boil any instrument for 10 minutes before it is used to handle dressings

II. Splints

A. Definition: implements for immobilizing fractured bone

B. Types and uses

1. Coaptation (fixation)

LESSON PLAN 7

(Use chalkboard illustrations.)

- a. Used solely to immobilize or stabilize fracture
- b. May be improvised from any material which is
 - (1) Light, but rigid
 - (2) Long enough to extend beyond the joints above and below the fracture
 - (3) Broad enough to prevent pinching of bandaged limb
 - (4) Sufficiently padded to protect part from undue pressure

2. Traction

- a. Used where there is sufficient muscle pull to displace bone fragments
- b. Employs extension and counterextension
- c. Improvised traction splints
 - (1) Must meet standards which apply for coaptation splints
 - (2) Clothes pole or fence picket may be used

APPLICATION

- I. Instructor's demonstration: use training manikin
 - A. Apply types of wound dressings regularly used by the military services
 - B. Improvise compresses and bandages from materials not regularly issued; emphasize precautions
 - C. Apply the four types of bandages described in the lesson
 - D. Apply splints and improvised splints

- II. Trainees' practice: applying dressings and splints on each other
 - A. Follow procedures demonstrated by instructor
 - 1. Use compresses and bandages of various sizes
 - 2. Apply to supposed wounds in different places
 - 3. Use both prepared and improvised materials
 - B. Answer instructor's questions on critical points in procedure
 - C. Instructor should indicate overall level of trainee performance on evaluation sheet
- III. If time permits, conduct a question and answer period to resolve any problems which may have arisen
- IV. Film showing: prepare projector and film in advance

LESSON PLAN 8

TITLE: THORACIC WOUNDS

OBJECTIVES

- I. To inform the trainee of procedures pertinent to the emergency care of thoracic wounds
- II. To develop the trainee's ability to provide emergency care for casualties with thoracic wounds

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Moulages
- III. Film: Sucking Wounds of the Chest (MN-7477). Color, sound, 14 minutes

REFERENCE

Blades, B.: Management of Injuries to the Thorax.
Journal of the American Medical Association 159:
419-21, Oct. 1955

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. All thoracic wounds may lead to serious respiratory and circulatory disturbances
 1. Compromised respiration results in inadequate oxygen intake
 2. Oxygenation must be improved promptly
 - B. Unattended thoracic injuries mean certain death

PRESENTATION

I. Types of thoracic wounds

A. Superficial

B. Nonpenetrating: crushed chest

1. Inspiration causes flail-like movement of chest wall
2. Mobile portion of the chest wall must be stabilized

C. Perforating or penetrating

1. Emergency care is limited to lifesaving measures only
2. Intrathoracic hemorrhage control is not indicated at the casualty level

II. Treatment of thoracic wounds

A. Diagnostic procedures

1. Examine for wounds of entry and/or exit
2. Observe any tears in clothing
3. Inquire about location of pain
4. Listen for sucking sound during inspiration
5. Palpate for painful areas

B. Syndrome

1. Dyspnea
2. Irregular, deep respiration
3. Cyanosis
4. Hemoptysis
5. Pain in trauma area

LESSON PLAN 8

6. Frothy blood in trauma area
 7. Subcutaneous emphysema
 8. Flail-like movement of the chest wall
- C. Active treatment
1. Prevent or relieve pneumothorax and/or mediastinal flutter
 - a. Seal entry wound tightly
 - (1) Accumulating air may cause lung collapse
 - (2) Death may result from respiratory insufficiency
 - b. Locate and seal any exit wounds
 - c. For advanced sucking wounds with tension pneumothorax
 - (1) Direct patient to strain down
 - (2) Momentarily uncover entry wound as air is expelled
 - (3) Re-cover wound when lung comes into view
 - d. Use any materials available to seal openings
 - (1) Firmly apply sterile compress as pressure dressing
 - (2) Cover dressing with any airtight material
 - (a) Adhesive tape
 - (b) Rubber
 - (c) Cellophane
 - (3) Secure seal with battle dressing or bandage

(4) Avoid passing bandage around the body to secure seal

(a) May restrict respiratory function

(b) May aggravate undetected rib injuries

e. Lift and stabilize crushed portion of chest

(1) With towel clamps

(2) With a blunt instrument inserted beneath the ribs

2. Treat for shock; shock position may be contraindicated

3. Position patient comfortably on the injured side

a. Blood and secretions will not settle on uninjured side

b. Keep patient quiet, avoid unnecessary handling

(1) Helps control hemorrhage in deep tissues

(2) Prevents further tissue damage

c. Secretions act to seal the wound

d. Gravity favors uninjured lung

D. Supporting treatment

1. Maintain airway

a. Clear breathing passages of blood and mucous to prevent strangulation

(1) Encourage coughing

(2) Aspirate chest if trained personnel and adequate equipment are available

b. Position patient to aid respiration

LESSON PLAN 8

2. Give oxygen if available and necessary
3. Control pain
 - a. Inject procaine to block intercostal nerves
 - b. As a general rule do not administer morphine
 - (1) Depresses respiration
 - (2) Do not overuse if use is necessary, especially when there are head injuries also
 - c. Avoid the use of other opiates
 - (1) Tend to dull cough reflexes
 - (2) Permit secretions to accumulate in trachea and bronchi

E. Evacuation

1. Give high priority consistent with the magnitude of the recovery situation to patients with thoracic wounds
2. High air evacuation where there are great changes in atmospheric pressure is not recommended

APPLICATION

- I. Instructor's demonstration: use training manikin
 - A. Proper emergency care of chest wounds
 - B. Approved positioning of casualty
 - C. Precautions to be observed
- II. Trainees' practice: use training moulages
 - A. Demonstrate grasp of procedures

B. Answer questions by instructor

1. Reasons for diagnosis of thoracic injury
2. Reasons for various procedures in treatment
3. Precautions to be observed

III. Film showing: prepare projector and film in advance

LESSON PLAN 9

TITLE: ABDOMINAL WOUNDS

OBJECTIVES

- I. To have the trainee learn the signs and symptoms of abdominal wounds
- II. To instruct the trainee in procedures for emergency treatment of abdominal wounds
- III. To develop trainee ability to provide emergency treatment for abdominal wounds

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Moulages
- III. Battle dressings, large size
- IV. Film: Penetrating Wounds of the Abdomen (MN-7470). Color, sound, 13 minutes

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. Emergency treatment can retard the morbid consequences of abdominal wounds
 - B. Emergency casualty care and rapid evacuation improve the prognosis for patients sustaining abdominal wounds

PRESENTATION

- I. Abdominal wound syndrome
 - A. Obvious wound

1. In abdominal wall
2. In back, chest, buttocks, or thigh

- B. Intense abdominal pain
- C. Nausea, vomiting
- D. Rigid abdominal muscles, revealed by palpation
- E. State of severe shock
- F. Visceral trauma may be caused by nonpenetrating agents also

II. Treatment of abdominal wounds

A. Active

1. Keep victim lying down with knees flexed
 - a. Lessens pain
 - b. Decreases tension on abdominal muscles
2. Remove large, nonpenetrating debris
3. Avoid handling viscera if possible
4. Viscera usually not replaced in cavity; to prevent further drying out and infection, might be replaced
 - a. Under extreme conditions of emergency
 - b. When definitive care will be much delayed
5. Cover the wound
 - a. Use sterile, loosely tied bandage, compress, or battle dressing
 - (1) Keep moist with sterile saline solution
 - (2) Use "clean" water if sterile moistening agents are unavailable
 - b. Use snug abdominal binder to prevent further evisceration

LESSON PLAN 9

B. Supporting

1. Treat for shock
2. Give whole blood to maintain adequate blood volume
3. Administer moderate dose of morphine to control pain
4. Give nothing by mouth
 - a. Perforated viscera may spill contents into peritoneal cavity
 - b. Moisten lips with water in cases of extreme thirst
5. Estimate damage to structures within the abdominal cavity
 - a. By color and nature of fluid extruded from wound
 - b. By blood loss
 - (1) Amount
 - (2) Origin
 - (3) Presence in urine or feces

C. Evacuate as soon as possible

1. Give highest priority consistent with situation
2. Handle carefully to prevent further injury

APPLICATION

I. Instructor's demonstration: use manikin

- A. Active and supporting emergency care as outlined
- B. Precautions emphasized

II. Trainees' practice: use moulages

- A. Demonstrate grasp of procedures until performance is satisfactory
- B. Answer any questions posed by instructor

III. Film showing: prepare projector and film in advance

- A. Prior to showing, indicate points to watch for
- B. After showing, question trainees on indicated points

LESSON PLAN 10

TITLE: HEAD AND NECK WOUNDS

OBJECTIVES

- I. To instruct the trainee in emergency care of head, face, and neck injuries
- II. To provide laboratory training in the emergency care of head injuries.

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Casts, arch bars, wires, plaster bandages, Taylor and Crawford appliances, surgical equipment

REFERENCES

- I. Kazanjian, V. H. and Converse, J. M.: Surgical Treatment of Facial Injuries. Baltimore: The Williams & Wilkins Co., 1949.
- II. National Research Council, Committee on Surgery: Burns, Shock, Wound Healing, and Vascular Injuries. Philadelphia: W. B. Saunders Co., 1943.
- III. Thoma, K. H.: Oral Surgery, ed. 3. St. Louis: C. V. Mosby Co., 1958.

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject

- A. In a mass casualty situation, wounds of the head, face, and neck become surgical emergencies only when an obstructed airway, profuse hemorrhage, or shock endangers life
- B. Intracranial injuries, eye injuries, fractures of cervical vertebrae, and, to a lesser extent, maxillofacial injuries urgently require definitive management by specialists
- C. Both early emergency treatment and early definitive treatment of head and neck wounds should be considered by the dental officer.

PRESENTATION

I. Emergency management of head and neck injuries

A. Examine and diagnose as thoroughly as possible

- 1. Good judgment is important to determine the extent of treatment permitted by the casualty situation
- 2. Use roentgenograms when possible to reveal the nature and extent of injuries not readily perceivable

B. Provide an adequate airway

- 1. Wounds to the head or neck may cause obstruction of the airway
 - a. A maxilla which is detached from its cranial base may drop over the tongue to occlude the bony airway
 - b. In mandibular fractures the attachment of tongue to symphysis may be depressed
 - (1) Muscles attached to hyoid bone are unsupported
 - (2) Hyoid bone drops backward
 - (3) Unsupported tongue falls against posterior wall of pharynx and occludes air passageway

LESSON PLAN 10

- c. In bilateral condylar fractures the mandible may be displaced posteriorly
 - (1) Tongue may drop backward to obstruct larynx
 - (2) Prevent asphyxia by providing adequate airway
 - 2. Routine procedure to clear airway: protract the tongue
 - a. Trendelenburg position, head to one side
 - b. Place suture through tongue and provide forward traction
 - c. Use gravity to keep the tongue forward
 - (1) Place patient in upright position
 - (2) Flex head forward
 - 3. Radical procedure to provide airway: perform cricothyroidotomy when other measures fail
- C. Control hemorrhage immediately
- 1. By hemostat, ligature, or pressure
 - 2. By nasal and/or postnasal packing when required by fractures in the nasomaxillary area
 - 3. By early reduction and temporary splinting of fractured bones of the face
- D. Prevent or treat shock
- 1. Place in shock position
 - 2. Keep patient warm, quiet, and lying down
 - 3. Relieve pain by sedation except in cases of intracranial injury
 - 4. Restore blood volume by infusions of whole blood or plasma volume expanders
- E. Administer antitetanus therapy

1. Provide protection against tetanus routinely in all facial injury emergencies
2. When service personnel are involved, give toxoid booster

II. Early definitive management of head and neck wounds

A. Evaluate the patient's general condition

1. Neurologic signs of intracranial injury
 - a. Restlessness
 - b. Drowsiness
 - c. Alterations in blood pressure, pulse rate, respiration
2. Manifestations of craniocerebral injury
 - a. Cerebrospinal rhinorrhea
 - b. Present or previous unconsciousness
 - c. Paralysis of one or more of the cranial nerves
 - (1) Loss of vision in one or both eyes
 - (2) Diplopia
 - (3) Variation in pupil size
 - d. Monoplegia, hemiplegia, or paraplegia
 - e. Abnormal reflex reaction
 - f. Bleeding from one or both ears, or Battle's sign
 - g. Nausea or vomiting

B. Determine the total injury resulting from facial fractures

1. Severe fractures of the maxilla and nasal bones may involve the cribriform plate of the ethmoid with injury to the dura

LESSON PLAN 10

2. A blow on the chin which fractures the mandible may also cause fracture of the base of the skull
 - a. Transmits force through the mandibular condyles
 - b. Drives condyles upward and backward through glenoid fossa to invade the middle cranial fossa
3. Early reduction of facial fractures accompanied by intracranial injury is the current method of choice
 - a. Will usually stop cerebrospinal rhinorrhea
 - b. Will check aural, nasal, and oral hemorrhage
- C. Perform as many concomitant operative procedures as the patient's condition permits
 1. Injuries that often require surgical care
 - a. Fractures of the skull, spine, or extremities
 - b. Wounds of the eye, chest, or abdomen
 2. Minor procedures that can be accomplished without undue risk while the patient still is under anesthesia
 - a. Reduction of nasal or zygomatic fractures
 - b. Primary suture of a lacerated eyelid or lip
- D. Estimate the extent of soft tissue damage
 1. Injured muscles, vessels, and nerves around the eye rarely require immediate surgery
 2. In most instances injury to areas surrounding the eye produces orbital edema
 - a. Surface conjunctiva is concealed
 - b. Inflammation is communicated to the eye
 - c. Reduce eyelid edema by use of cold applications

E. Give EMERGENCY TREATMENT ONLY to eye injuries

1. Disruption as a result of direct missile violence

- a. Leave the decision to enucleate to a specialist: ENUCLEATION ON THE BATTLEFIELD IS SELDOM NECESSARY
- b. Be alert for signs of further injury: subconjunctival hemorrhage sometimes indicates brain hemorrhage from a basal skull fracture
- c. Stanch hemorrhage by gentle compression
- d. Irrigate with normal saline solution at body temperature
- e. Remove loose foreign material
- f. Protect eyeball from further trauma and effects of exposure
 - (1) Remove or reduce fractured orbital bones
 - (2) Suture lacerated eyelid
- g. Cover with a bland oil, ophthalmic ointment, or vaseline-impregnated dressing
- h. Bandage both injured and uninjured eye to minimize eye movement if conditions do not preclude making a litter case of patient
- i. DO NOT BANDAGE BEFORE THOROUGH EXAMINATION HAS BEEN MADE
 - (1) Undiscovered foreign particles may be forced into the eye
 - (2) Infection of the conjunctiva may be fostered

2. Burns of the eyelid and cornea

- a. Guard against INFECTION, corneal exposure, ectropion, ulceration, and perforation
- b. Cover burned area with bland oil or neutral salve

LESSON PLAN 10

- c. Gently swab away burned skin and debris
 - d. Treat the burn as an open wound, medicate with local chemotherapy and antibiotics
 - e. Leave cosmetic defects for later specialized care
- F. Determine location, nature, and extent of injuries not readily perceivable
- 1. Early edema or hematoma may conceal changes in contour and make detection of facial fractures difficult
 - 2. Roentgenographic examination is necessary for a complete, accurate diagnosis
 - 3. Indications of maxillofacial injury revealed by palpation
 - a. Pain, crepitus
 - b. Loss of bony continuity
 - 4. Indications of mandibular fracture or dislocation
 - a. Loss of normal occlusion or open occlusion
 - b. Trismus
 - c. Deviation in condylar movement when mouth is opened
 - (1) Toward injured side
 - (2) Failure to rotate and glide forward: revealed by palpation through the external auditory canals
 - 5. Indications of maxillary fracture or displacement
 - a. Subconjunctival hemorrhage with ecchymosis and edema of the eyelids
 - b. Loss of normal occlusion
 - c. Open occlusion signifies upward and backward displacement

6. Indications of zygomatic fracture

- a. Subconjunctival hemorrhage
- b. Trismus
- c. Changes in facial structure revealed by full-face examination
 - (1) Stand behind the patient
 - (2) Palpate both zygomatic arches and both infraorbital ridges simultaneously for comparison

7. Indications of nasal fracture

- a. Subconjunctival hemorrhage
- b. Ecchymosis of the eyelids
- c. Change in nasal contour in relation to severity
 - (1) Swollen soft tissues
 - (2) Flattening or deviation, sometimes concealed by early edema or hematoma
- d. Fractures may be reduced soon after injury
 - (1) Anesthetize locally
 - (2) Place rubber- or cotton-covered elevator intranasally along lateral wall beneath fractured bones
 - (3) Raise nasal arch until desirable contour is achieved
 - (4) Provide additional support to comminuted fractures for a few days
 - (a) To immobilize fragments in corrected position
 - (b) Pack nasal cavity with petrolatum-gauze strips to provide early fixation

LESSON PLAN 10

APPLICATION

- I. Instructor's demonstration
 - A. Use facsimile abdomen to demonstrate control of hemorrhage by use of instruments
 - B. Use manikin to demonstrate diagnosis of injuries to the skull and soft tissues of the head
- II. Trainees' practice: as directed by instructor

TITLE: FRACTURES

OBJECTIVES

- I. To have the trainee learn to recognize the types of fractures
- II. To enable the trainee to provide emergency treatment of fractures

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Splints and materials for improvised splints
- III. Dressings, in all available sizes
- IV. Chalkboard, chalk, and erasers
- V. Film: First Aid for Fractures (MN-8184). Parts A and B, color; parts C through E, black and white; sound; 40 minutes

REFERENCES

- I. American National Red Cross: First Aid Textbook, ed. 4. Garden City, New York: Doubleday and Company, Inc., 1957
- II. Handbook of the Hospital Corps, United States Navy (NAVMED P-5004). Washington: U. S. Government Printing Office.

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. The 206 bones of the human skeleton give the body form, support its weight, protect its vital organs, and make mobility possible

LESSON PLAN 11

- B. If any of the bones are broken, the fractured part may change shape, support may be lost, vital structures near the fractured bone may be injured, and mobility may be restricted

PRESENTATION

I. Classifications of fractures

A. According to effect on surrounding soft tissue

1. Open fracture

- a. Wound channel between the fractured bone and the body surface
- b. Bone does not always protrude

2. Closed fracture

- a. No break in skin
- b. No external bleeding

B. According to condition of bone

1. Comminuted fracture

- a. Bone is shattered or splintered
- b. Surrounding tissue is greatly damaged

2. Impacted fracture: segments of the broken bone lie adjacent to each other and may overlap

3. Greenstick fracture

- a. Bone separation is incomplete
- b. Some bone fibers are severed; some remain intact

II. Signs of fracture

A. Open fracture

- 1. Apparent wound, hemorrhage
- 2. Bone ends may protrude

B. Closed fracture

1. Signs controlled by the degree of bone displacement
2. Examination reveals
 - a. Pain, especially upon movement
 - b. Tenderness upon application of any pressure
 - c. Crepitus
 - d. Swelling and discoloration increasing with time
 - e. Loss of ability to use the fractured part
 - f. Deformity
 - g. Unnatural movements

III. Treatment of fractures

- A. DO NOT MOVE PATIENT BEFORE A SPLINT IS APPLIED
- B. Control hemorrhage
 1. A skillfully applied pressure bandage usually is adequate
 2. For arterial bleeding that is otherwise uncontrollable
 - a. Clamp and ligate severed vessels
 - b. Use a tourniquet: AVOID PROMISCUOUS USE
- C. Prevent infection
 1. Dress wound
 2. Do not aggravate wound by the use of excessive pressure while applying bandage
- D. Immobilize the fracture and surrounding areas
 1. Prevents further trauma

LESSON PLAN 11

2. Prevents further injury to blood vessels
3. Limits amount of pain and effects of shock
4. Use manufactured or improvised splints
 - a. Coaptation splint
 - b. Board, sticks, poles
 - c. Magazines
 - d. Preformed wire splints, wire mesh, wire ladders
 - e. Thomas traction splint for fractures of lower extremities
 - (1) Do not create too much traction or cause pressure on the foot with the appliance
 - (2) Use adequate padding, spread pressure over a wide area
 - f. Use of the wrong type splint causes excessive pressure on the tissues
- E. Treat for shock
- F. Relieve pain
- V. Precautions
 - A. Splint all fractures or suspected fractures
 - B. Fasten firmly with square knots all the materials used to secure splints to fractures

APPLICATION

- I. Instructor's demonstration: use manikin
 - A. Procedures for treating open fractures
 1. Emphasize importance of hemorrhage control
 2. Stress importance of preventing infection

B. Use of splints to immobilize open and closed fractures

C. Precautions to be observed in the use of traction splints

II. Trainees' practice: as directed by instructor

III. Film showing: prepare projector and film in advance

LESSON PLAN 12

TITLE: BURNS

OBJECTIVES

- I. To have the trainee realize the importance of burn classification as a guide to treatment
- II. To have the trainee learn to treat burn shock on a mass casualty basis
- III. To instruct the trainee in the emergency treatment of burns in a mass casualty situation
- IV. To impress upon the trainee the importance of early emergency care and prompt evacuation of severely burned casualties
- V. To offer some insight into the problems of definitive burn treatment to aid the trainee in establishing a rationale for casualty care procedures and for the establishment of emergency facilities and logistics

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Universal Protective Dressings, fine mesh gauze, bandages
- III. Chalkboard, chalk, erasers
- IV. Films
 - A. First Aid for Burns (MN-8185). Color, sound, 22 minutes
 - B. Management of Burns (U.S. Army, PMF 5318 and PMF 5319). Color, sound, 31 minutes (total)

REFERENCES

- I. Artz, C. P. and Soroff, H. S.: Modern Concepts in the Treatment of Burns. Journal of the American Medical Association 159:411, Oct. 1955
- II. Enyart, J. L.: The U.S.S. Bennington Disaster. U. S. Armed Forces Medical Journal, Oct. 1954

- III. National Research Council, Committee on Surgery, Burns, Shock, Wound Healing and Vascular Injuries. Philadelphia: W. B. Saunders Co., 1943
- IV. National Research Council, Symposium on Burns. Washington: National Academy of Sciences, 1951

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. In the past, limited disasters have severely taxed all immediately available hospital facilities
 - 1. Coconut Grove fire in Boston
 - 2. U.S.S. Bennington explosion
 - B. A simple exercise in mathematics may illustrate the importance of acquiring an ability to treat burns
 - 1. Assume that under normal, ideal circumstances 7 trained persons are required to care for 1 seriously burned individual
 - 2. An estimated 20 percent of a city's population will be seriously burned as a result of a thermonuclear explosion
 - 3. How many trained workers will be needed to care for those seriously burned? (Compute for the immediate locality.)

PRESENTATION

- I. Great number of burn casualties
 - 1. Persons with little chance of survival
 - a. Extensive, extreme burns
 - b. Lethal doses of radiation

LESSON PLAN 12

2. Those not seriously burned who will recover with little care
 3. Those with a chance of useful survival if aided by all available facilities
- B. Shortage of parenteral fluids, dressings, medications, hospital facilities, transportation, and trained personnel
- C. Triage of burn casualties and concentration on care of those with a good chance for survival becomes an unpleasant necessity
- D. No one routine treatment can be applicable under casualty conditions; therapy must be modified for mass application

II. Classification of burns

A. According to cause

1. Thermal

a. Produced by direct heat

- (1) Fire
- (2) Scalds
- (3) Sun
- (4) Explosion blasts

b. Types

(1) Flash burn

- (a) Result of direct thermal radiation
- (b) Seriousness varies in proportion to proximity to blast
- (c) Light-colored clothing or other shielding material affords protection

(2) Flame burn

- (a) From secondary fires caused by overturned stoves, broken gas lines, wood fires

- (b) From other fires induced by thermal blast waves of the explosion

2. Chemical

- a. Produced by chemical action on tissue
- b. Resemble thermal burns

3. Electrical: of two types

a. Superficial

- (1) Produced by electric flash
- (2) Similar to thermal flash burn

b. Deep

- (1) Produced by electric current
- (2) Small surface wound, extensive deep tissue destruction

B. According to depth of damage: determined by heat intensity, exposure time

1. First-degree

- a. Characteristic: reddening of the skin
- b. Heals in from 3 to 5 days

2. Second-degree

a. Characteristics

- (1) Blistering of the skin
- (2) Painfulness
- (3) Partial destruction of skin thickness

b. Types

- (1) Superficial: heals in from 7 to 14 days
- (2) Deep: heals in from 2 to 4 weeks

LESSON PLAN 12

3. Third-degree

a. Characteristics

- (1) Complete destruction of skin
- (2) Charring and cooking of the deeper tissues

b. Most serious burn

- (1) Produces a deeper state of shock
- (2) Causes more permanent damage and disfigurement
- (3) Sensory nerve endings are destroyed; hence, is not painful

C. According to extent of damage

1. Determined by percentage of body surface involved
2. "Rule of Nines" is method used to estimate (Illustrate on chalkboard; use drawing on next page as guide)

D. For emergency treatment of mass casualties

1. Superficial

a. First-degree burns

b. Lesser second-degree burns needing little more than self-care

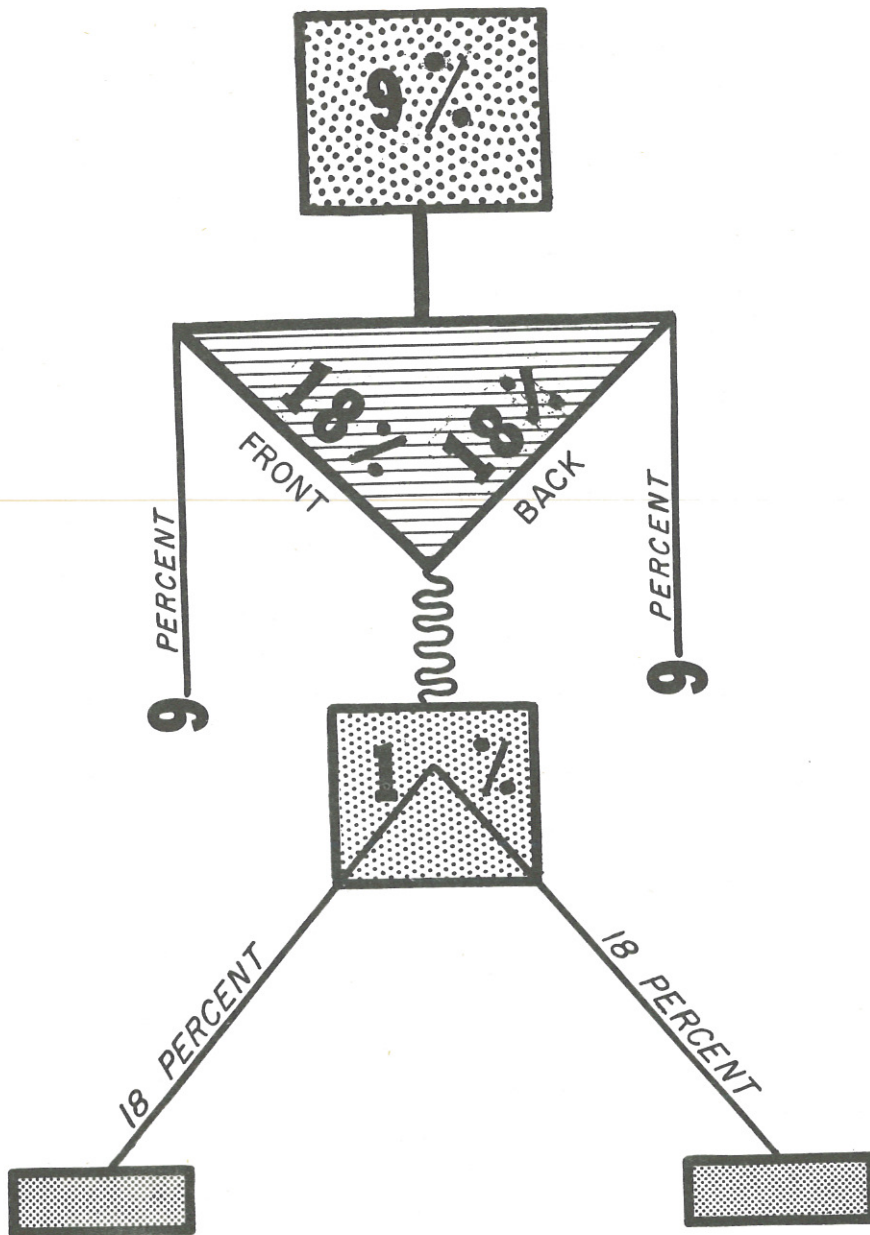
2. Deep: Their treatment is primary consideration of this lecture

a. More serious second-degree burns

b. Third-degree burns

III. Treatment of superficial burns: to be undertaken if time and facilities permit

A. Cleanse with soap and water



LESSON PLAN 12

- B. Break blisters
 - C. Cut away detached tissue
 - D. Apply a light dressing to protect against infection or mechanical trauma
- IV. Emergency treatment
- A. Deep burns
 - 1. Control shock
 - a. Etiology of burn shock
 - (1) Continuous loss of body fluids
 - (a) Initial loss of red blood cells; simultaneous tissue damage
 - 1. Caused by heat action
 - 2. In proportion to size and degree of burn
 - (b) Subsequent loss of serum and plasma
 - 1. Reduces effective circulating blood volume
 - 2. Causes overconcentration of red blood cells
 - (c) Constant absorption of toxic products from destroyed tissues
 - b. Treatment of burn shock
 - (1) Maintain body temperature
 - (2) Protect patient from cold, excessive heat, and rough handling
 - (3) Administer fluids
 - (a) Intravenously, especially if more than 20 percent of the body is burned
 - 1. First, give whole blood to replace damaged cells

2. Follow with plasma volume expander to restore circulating volume

(b) Orally

1. If fluids for transfusion are unavailable
2. If time does not permit intravenous transfusion
3. Introduce GRADUALLY
 - a. Frequent, small amounts of hot coffee, broth, or tea
 - b. Large quantities given too soon cause distention, nausea, and vomiting
4. When patient can tolerate larger quantities
 - a. Give a solution of 1 teaspoonful sodium citrate to 1 quart water
 - b. If sodium citrate is unavailable substitute 1 teaspoonful sodium bicarbonate

2. Relieve pain

- a. Peripheral circulatory collapse may prevent rapid absorption of subcutaneously administered medicaments
 - (1) Administer morphine, 1/8 gr., intravenously
 - (2) If morphine is unavailable give aspirin and codeine or demerol, orally
- b. Superficial burns may be extremely painful even though nerve endings in the corium are destroyed
 - (1) APPLY NO TOPICAL MEDICATION DURING EMERGENCY CARE

LESSON PLAN 12

- (2) In extreme emergencies, if drugs are not available apply petrolatum or one of its substitutes
 - (3) DO NOT USE TANNIC ACID; it may have a toxic effect on the liver
 - 3. Provide protection for the burned area
 - a. Remove charred, soiled clothing
 - b. Debride as necessary
 - c. Apply a Universal Protective Dressing
 - d. Leave the wound open and dry
 - (1) When this is the treatment of choice
 - (2) If there are no facilities for proper care
 - 4. Maintain an adequate airway
 - a. Burns of the head and neck may cause airway obstruction
 - b. Injury from inhalation of hot gases may impede respiration
 - 5. Prevent development of overlying wound infections
 - a. Begin antibiotic therapy
 - b. Give systemic antibiotics if they are available
 - 6. Elevate and immobilize the burned area
- B. Extensive deep burns
- 1. Rapid evacuation for definitive treatment is greatest lifesaving factor
 - 2. Only minimal care should be given at casualty level
 - a. Alleviate pain and control shock

- b. Remove debris and loose clothing that would irritate the wound during interim treatment and transportation

- (1) Take care not to contaminate the usually sterile burned area

- (2) Cut around cloth adhering to the burn and leave it for later removal

- c. In transit, keep patient warm and in shock position

C. Burns complicated by other wounds

- 1. Cover with a Universal Protective Dressing

- 2. Evacuate for definitive treatment

V. Definitive treatment

- A. Remove remaining gross debris and constricting clothing

- B. Complete debridement if necessary

- C. Choose most desirable treatment procedure

1. Exposure method

- a. Found by the armed services to be excellent for care of mass casualties

- b. Definitely a hospital procedure

- (1) Place patient in room or ward that is relatively bacteria-free

- (2) Leave wound uncovered

- (3) Sedate and give antibiotic therapy

- (4) Elevate and immobilize burned area

- (5) Turn patient at regular intervals if burns are circumferential

- (6) Replace fluids at a rate the same as the urinary output

LESSON PLAN 12

c. Recovery is rapid

- (1) Serum exudate forms over burn during first 24 hours
- (2) Exudate begins to crust over in the next 24 hours
- (3) Crust is left undisturbed to desquamate normally

2. Closed dressing method

a. Use depends upon

- (1) Availability of medical supplies and personnel
- (2) Location, extent, and depth of burn
- (3) Presence and severity of complicating injuries
- (4) Environmental conditions

APPLICATION

- I. Instructor's demonstration: use manikin
 - A. Procedures for open and closed treatment of second- and third-degree burns
 - B. Explain reasons for procedures as demonstration progresses
- II. Trainees' practice: as directed by instructor
- III. Film showing: prepare projector and film in advance

TITLE: PARENTERAL THERAPY

OBJECTIVES

- I. To help the trainee realize the importance of parenteral therapy
- II. To instruct the trainee in venipuncture and blood-typing procedures
- III. To teach the trainee a standard procedure for administering intravenous fluids
- IV. To have the trainee learn the precautions to be observed in administering fluids intravenously

TRAINING AIDS

- I. Facsimile arm, Medical Department, U. S. Navy, with replacement supplies of simulated blood, blood vessels, and skin
- II. Blood-typing block, with testing sera and replacement supplies of sera
- III. Hypodermic syringes, with 18-, 19-, and 20-gage Luer-Lok needles
- IV. Film: Venipuncture (MN-9375C). Color, sound, 7 minutes
- V. Chalkboard, chalk, eraser
- VI. Slides showing various stages of procedure
- VII. Rubber tubing to serve as tourniquets

REFERENCES

- I. American Medical Association, Council on Pharmacy and Chemistry: Fundamentals of Anesthesia, ed. 3. Philadelphia: W. B. Saunders Co., 1954
- II. Lundy, J. S.: Clinical Anesthesia. Philadelphia: W. B. Saunders Co., 1942

LESSON PLAN 13

- III. U. S. Federal Civil Defense Administration: Blood and Blood Derivatives Program (TM-11-5). Washington: U. S. Government Printing Office, 1952
- IV. Handbook of the Hospital Corps, United States Navy (NAVMED P-5004). Washington: U. S. Government Printing Office

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject

PRESENTATION

- I. Importance of training in procedures for parenteral therapy
 - A. A thorough knowledge of venipuncture technique is necessary for obtaining and administering blood donations
 - 1. Whole blood is the only completely satisfactory replacement solution for shock-producing hemorrhage
 - 2. Under peacetime conditions procuring blood donors is difficult and storage of whole blood is a problem
 - 3. A greatly accelerated blood donor program will be required to provide all the blood needed
 - B. In a major disaster, members of the health services will be unable to care for all who need intravenous therapy
 - 1. Lives may depend on the intravenous administration of fluids or injection of medicaments
 - 2. Stockpiles of dextran, PVP, or gelatin are useless without trained personnel to administer them to casualties needing blood or blood substitutes

3. Training in venipuncture is necessary for intravenous injection of medicaments

- C. Trained personnel will be needed to teach venipuncture to emergency workers

II. Venipuncture to withdraw blood

(Use chalk-board illustrations and appropriate slides.)

- A. Decide on a donation site

1. Physical conditions may not allow use of the ideal location or procedure
2. Veins of the arm, hand, neck, leg, ankle, and foot may be used

- B. Create a maximum supply of blood in the vessel

1. Apply a tourniquet approximately 3 inches above the proposed site of insertion
 - a. Tighten just enough to stop the venous flow of blood
 - b. Will help to stabilize the vessel

2. If site is on the arm have patient clench his fist to keep the vein filled with blood

- C. Locate the vein

1. Observation may be adequate
2. Using the fingers, slap or snap the area over the selected vein
3. "Milk" from the end of the extremity toward the body
4. Allow the extremity to hang downward
5. Apply hot, wet towels to the extremity
6. If emergency conditions require, incise the overlying area in order to locate and enter a vein

- D. Prepare the site of insertion

1. Stabilize the appendage

LESSON PLAN 13

2. Cleanse the area of needle insertion with soap and water, alcohol, or benzalkonium chloride
3. Under emergency conditions, a wheal of procaine at the puncture site is unnecessary

E. Insert a short-bevel needle

1. Can be inserted farther with less danger of vein perforation
2. For proper needle insertion
 - a. Insert toward the body always
 - b. Hold the bevel UPWARD
 - c. When the vein is small hold the bevel DOWNWARD

F. Withdraw the blood

1. Slowly, to prevent vessel collapse or injury
2. Stabilize the needle so that the vein will not be traumatized
3. Rotate the plunger of the syringe

G. Withdraw the needle

H. Cover the insertion site with a sterile compress

1. To prevent infection
2. Hold firmly to control bleeding

III. Blood typing

(Use chalk-board illustrations and appropriate slides.)

- A. Explain the procedure for determining the type of blood withdrawn
- B. Demonstrate, using facsimile blood and typing block
 1. Expel 2 or 3 drops from the needle into each of 2 micro test tubes
 - a. Emphasize the difference from real blood typing

(1) Real blood must be diluted many times so that there is a suspension of cells in water

(2) Facsimile blood is not diluted because the reagents used would be too weak to react

2. Place one tube on the A side of the block, the other on the B side

a. Add two drops of facsimile A serum (anti B), which is found on the block, to the tube on the A side

b. Add two drops of facsimile B serum (anti A) to the tube on the B side

3. Examine the tubes for coagulation or precipitation

a. The two reactions are very similar in appearance

(1) When a solution of real blood is used, there is clumping of cells

(2) When facsimile blood is used, there is precipitation of microcrystals

b. Facsimile solutions react much more rapidly than do actual blood solutions

C. Determine the blood type

1. If both tubes A and B are clear, the blood is type O

2. If A is clear and B is precipitated, the blood is type A

3. If B is clear and A is precipitated, the blood is type B

4. If both tubes A and B are precipitated, the blood is type AB

IV. Venipuncture for prolonged administration of intravenous fluids

LESSON PLAN 13

- A. Explain the procedure
- B. Method used by the Navy is described in the Handbook of the Hospital Corps

APPLICATION

- I. Instructor's demonstration
 - A. Follow steps as explained in lesson
 - B. Explain each step thoroughly as the demonstration proceeds
 - C. Omit suggested procedures which obviously are impracticable, but call attention to them for trainees' recollection
 - D. Use applicable training aids for each procedure
 - 1. Venipuncture to withdraw blood: facsimile arm and blood supply
 - 2. Blood-typing procedure: blood-typing block and facsimile sera withdrawn during venipuncture demonstration
 - 3. Administration of intravenous fluids: facsimile arm
- II. Trainees' practice: question closely on procedure
 - A. Location of venipuncture sites on each other and application of a tourniquet
 - B. Venipuncture on the facsimile arm
 - 1. Repeat several times
 - 2. Determine the blood type each time
 - C. If the class is far enough advanced, venipuncture on each other
- III. Film showing: prepare films and projector in advance

TITLE: FIELD ANESTHESIA

OBJECTIVES

- I. To have the trainee learn the types, uses, and effects of local and general anesthetics
- II. To acquaint the trainee with procedures for administering local and general anesthetics
- III. To provide the trainee with practice in administering those anesthetics preferred for field use

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Facsimile arm
- III. Gauze and wire for fabrication of ether masks
- IV. Hypodermic syringes; 18-, 19-, and 20-gage Luer-Lok needles
- V. Ether cans with contents replaced by water
- VI. Film: Disaster Anesthesia (MC-8316). Color, sound, 33 minutes

REFERENCE

Handbook of the Hospital Corps, United States Navy (NAVMED P-5004). Washington: U. S. Government Printing Office

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. Dental officers serving as surgical assistants in time of disaster may be required to administer anesthetics

LESSON PLAN 14

- B. Dental officers may be required to direct untrained persons in the administration of anesthetics

PRESENTATION

I. Types of anesthesia

A. Local anesthesia

1. Loss of sensation through temporary paralysis of peripheral sensory nerves
 - a. Affects only the region or section served by the blocked nerves
 - b. Does not interfere with consciousness
 - c. Has the least detrimental effect systemically
2. Preferred if profound enough to control pain during and after casualty treatment
3. Best for operative procedures on patients in, near, or recovering from shock
4. May be used in operations involving severe trauma
5. Types of local anesthesia
 - a. Nerve block
 - (1) Produced by blocking large branches of sensory nerves
 - (2) Agent is injected at some distance from area to be anesthetized
 - b. Infiltration
 - (1) Produced by blocking nerve endings
 - (2) Limited to area where drug is injected
 - c. Topical: produced by applying anesthetic agent to skin or mucous membrane

- B. Spinal anesthesia: field use is contraindicated

1. Should never be administered by the inexperienced
2. The wounded tolerate it poorly

C. General anesthesia

1. Used when local anesthesia is inadequate
2. Complete loss of consciousness and sensation
3. Four stages

a. Analgesia

- (1) Patient begins to lose consciousness
- (2) Displays lessened reaction to pain
- (3) Respiration

(a) Slightly deeper than normal

(b) Slightly faster than normal

b. Excitement

- (1) Patient moves and reacts violently
- (2) Respiration

(a) Very irregular

(b) May be faster, slower, deeper, or shallower than normal

c. Complete anesthesia

- (1) Divided into 4 planes, by degree

(a) Light

(b) Deepening respiration

(c) Deep anesthesia

(d) Paralysis of diaphragm: toxic

- (2) Respiration

LESSON PLAN 14

- (a) Depends upon plane
 - (b) Ideally, very regular; slightly deeper and faster than normal
- d. Toxic: anesthesia is too deep
 - (1) Shallow, fast, more abdominal respiration
 - (2) May result in death from respiratory or circulatory failure
- 4. Types of general anesthesia
 - a. Inhalation
 - (1) Produced by use of ethyl ether
 - (2) Produced by use of nitrous oxide and oxygen
 - (a) Adequate for minor procedures if facilities and trained personnel are available
 - (b) Impracticable for field use
 - b. Intravenous anesthesia: produced by use of thiopental sodium
 - c. Rectal anesthesia
 - (1) Used only in carefully selected cases
 - (2) Proper administration requires expert training

II. Anesthetics to be considered for casualty care

A. Procaine: produces local anesthesia

- 1. Used in 0.5 to 2 percent solutions, to which has been added 1:200,000 to 1:150,000 epinephrine to prolong the anesthetic effect
 - a. DO NOT COMBINE EPINEPHRINE WITH LOCAL ANESTHETICS FOR USE IN SURGERY OF THE FINGERS, TOES, EARS, PENIS, OR SCROTUM

- b. Vasoconstrictor agents limit supply of blood; may cause tissue damage
- 2. Supplied in carpules or may be made from procaine ampules, sterile distilled water, and epinephrine
- 3. Administered subcutaneously
 - a. Scrub injection site and apply an antiseptic
 - b. With a sterile needle held bevel down in area to be anesthetized, make base wheal by injecting procaine solution just under surface of skin
 - c. Make major injection through wheal in direction of area to be anesthetized
 - d. Express procaine solution slowly ahead of needle when it is advanced as well as when it is withdrawn
 - e. Inject anesthetic agent until sufficient anesthesia results
 - f. Maximum dosages
 - (1) 0.5 percent solution: 200 cc.
 - (2) 1 percent solution: 100 cc.
 - (3) 2 percent solution: 50 cc.
- 4. Precautions
 - a. Avoid use of all local anesthetic agents if patient has history of sensitivity to them
 - b. Do not inject into traumatized or infected tissues
 - c. Aspirate syringe frequently while injecting to make certain that anesthetic is not being injected into blood stream
 - d. Watch for signs of central nervous system stimulation
 - (1) Perspiration, pallor, tremors, convulsions, unconsciousness

- (2) Route, amount, or rapid rate of administration may produce toxicity
- e. Always use freshly prepared solutions or properly stored carpules
- f. Give preanesthetic medication; may be impossible under disaster conditions
- 5. Remedies for overdosage
 - a. To control convulsions
 - (1) Soluble barbiturates, 2 to 4 gr. (120 to 240 mg.), intravenously
 - (a) Pentobarbital sodium
 - (b) Thiopental sodium
 - (2) Give only enough to control; never more than amount indicated
 - b. To counteract procaine poisoning, indicated by circulatory collapse
 - (1) Ephedrine, 25 mg., intravenously
 - (2) Neosynephrine, 1 mg., intravenously
- B. Ethyl ether: produces general anesthesia
 - 1. Administered by open drop method, explained in reference for this lecture and in film, "Disaster Anesthesia"
 - 2. Advantages
 - a. Probably the agent best suited to produce deep anesthesia in event of a major disaster
 - b. Can be used safely by less formally trained personnel under supervision
 - c. Is readily available; can be stocked with some precaution and care
 - d. Does not require elaborate and heavy equipment for use

- e. Induction of anesthesia with ether is particularly easy
- f. Is the anesthetic of choice for seriously wounded, EXCEPT IN CASES OF
 - (1) Coma
 - (2) Shock
 - (3) Blast injuries
 - (4) Thoracic injuries
 - (5) Head injuries

3. Disadvantages

- a. Is flammable and explosive
- b. Must be used with care, especially in close, nonventilated places
- c. Cans of ether should be cooled by ice or water just before use in hot climates
- d. Is irritating to respiratory tract

4. Precaution

- a. Vomitus in the airway during anesthetic procedures can cause death
- b. Empty the stomach of food before administering anesthetic
 - (1) Stimulate pharynx
 - (2) Insert large bore gastric pump
 - (3) Give emetic: ipecac or apomorphine

5. Preanesthetic medication

- a. Often difficult to effect during a disaster
- b. If possible, use one of the following

LESSON PLAN 14

(1) Atropine, 1/100 gr. or 0.4 mg.

(a) Subcutaneously, approximately 1 hour before general anesthetic

(b) Intravenously, to hasten effect and save time, immediately preceding surgery

(2) Pentobarbital sodium, 1 1/2 gr.

(a) By mouth, 1 hour before anesthetic

(b) Intravenously if time is short

(3) Morphine, 1/4 gr., intramuscularly

(a) Generally not indicated because of depressant action on central nervous system

(b) Should not be used in cases of shock except slowly, intravenously

(4) Demerol, 50 to 100 mg.

(a) Subcutaneously

(b) Is less of a depressant than morphine

C. Thiopental sodium: produces general anesthesia

1. Administered intravenously in solutions of no more than 2 1/2 percent
2. Use requires routine administration of oxygen in all surgical procedures lasting more than half an hour
3. Make frequent observation of pulse rate and blood pressure during anesthesia mandatory
4. Advantages
 - a. Is easily available
 - b. Equipment needed for administration is compact and uncomplicated

- c. Can be administered effectively by the inexperienced with apparent success
- d. Patient usually awakens promptly
- e. Has proved to be of great value in providing anesthesia for SHORT (half hour) PROCEDURES ON MEN IN GOOD CONDITION WITH SLIGHT WOUNDS

5. Disadvantages

- a. Is extremely dangerous when administered to patient in shock; only small dose is required
- b. An overdose is not always easy to counteract
- c. Use is incompatible with certain types of injury
- d. Fatal dose varies widely from one patient to another

6. Physiologic effect

- a. Impairs the sensitivity of the respiratory center to its normal chief stimulus, carbon dioxide
- b. To maintain respiration under full thiopental anesthesia
 - (1) Body shifts from normal driving action of carbon dioxide on respiratory center to action of anoxia on carotid mechanisms in neck
 - (2) Anoxia stimulates respiration as powerfully under deep anesthesia as under light anesthesia
 - (3) Respiratory stimulation may be interpreted as indication of returning consciousness, whereas it may mean that patient is not getting enough oxygen
 - (4) The wrong interpretation, leading to further administration of thiopental, has caused death

LESSON PLAN 14

- c. True depth of thiopental-induced anesthesia may be impossible to determine when oxygen content of blood is low
 - d. Supplement of thiopental-induced anesthesia with 50 percent nitrous oxide and 50 percent oxygen is desirable practice
7. Preanesthetic medication
- a. Morphine
 - (1) May or may not be used
 - (2) Probably lessens the quantity of thiopental needed
 - b. Atropine, to minimize vagal reflexes
 - (1) 1/100 gr., subcutaneously, about 1 hour before administering anesthetic
 - (2) 1/200 gr., intravenously, just before administering anesthetic
 - (3) When patient load is heavy, 1/100 gr., intravenously, 10 or 15 minutes before anesthesia is satisfactory
 - (4) Reduce amount in the presence of severe tachycardia
8. To counteract laryngeal spasm occurring during thiopental anesthesia
- a. Give oxygen
 - b. Inject atropine, 1/100 gr., even though the same amount has been used previously for preanesthetic medication
9. Precautions
- a. USE OF THIOFENTAL SODIUM IS CONTRAINDICATED
 - (1) For the seriously wounded
 - (2) Use of ether is safer when shock is present or possible

- (a) Penetrating wounds of chest or abdomen
- (b) Open fractures of femur
- (c) Severe hemorrhage, even from otherwise trivial wounds
- (3) When foreign matter, such as blood, vomitus, or secretions, is liable to be in the pharynx
- (4) When patient is suffering from overdose of morphine

b. USE OF THIOPENTAL MAY BE DEBATABLE BUT IS USUALLY UNWISE

- (1) When the operative position or procedure may obstruct the airway or make artificial respiration difficult
 - (a) Facedown position
 - (b) Surgery to repair maxillofacial injuries or other injuries involving the airway
 - (c) If local anesthesia is inadequate; use ether, preferably with endotracheal intubation
- (2) For intracranial surgery
 - (a) Usually operations are long and blood loss is great
 - (b) Thiopental often causes unexpected respiratory depression and anoxia
 - 1. Brain swells
 - 2. Procedure becomes more difficult or impossible
 - (c) Use of local anesthetic or ether is best
- (3) For severely burned patients

LESSON PLAN 14

c. ADMINISTER OXYGEN WITH THIOPENTAL SODIUM

- (1) To be safe
- (2) During long operations always

d. USE OF CARBON DIOXIDE AS A "STIMULANT" FOR TREATMENT OF RESPIRATORY DEPRESSION CAUSED BY THIOPENTAL OR ANY OTHER BARBITURATE IS CONTRAINDICATED

III. Film showing: prepare film and projector in advance

IV. Summary

A. Anesthetics of choice

1. Procaine if local anesthesia is adequate
2. Ether if inhalation anesthesia is used

B. Nitrous oxide is adequate for minor procedures when facilities and personnel trained to administer it are available

C. Thiopental sodium and anesthetics administered via the spinal canal are not indicated for general use with the seriously wounded at the field level of casualty treatment.

APPLICATION

I. Instructor's demonstration: use training aids

A. Administer local anesthetic agents and thiopental sodium

1. Observe precautions covered in lesson
2. Stress maximum dosages

B. Administer ether by the open drop method

1. Follow procedure shown in film
2. Fabricate masks from gauze and wire
3. Show how to open ether cans and use contents

- a. Show how to obtain desired rate of drop
- b. Emphasize precautions connected with use

II. Trainees' practice: use training aids

- A. Repeat procedures demonstrated by instructor
- B. Answer instructor's questions
 - 1. Dosages, precautions, indications, contra-indications, and procedures for use of agents at field level
 - 2. Advantages and disadvantages of agents

LESSON PLAN 15

TITLE: MEDICAMENTS

OBJECTIVES

- I. To acquaint the trainee with the purpose of medicaments administered during emergency treatment
- II. To acquaint the trainee with the nature and characteristics of medicaments used

TRAINING AIDS

- I. Manikin, Medical Department, U. S. Navy
- II. Facsimile arm
- III. Hypodermic syringes; 18-, 19-, and 20-gage Luer-Lok needles
- IV. Films
 - A. First Aid Use of Morphine (MN-8189). Color, sound, 20 minutes
 - B. The Management of Shock with Polyvinyl Pyrrolidone. Color, sound, 40 minutes

REFERENCES

- I. Bastedo, W. A.: Pharmacology, Therapeutics, and Prescription writing, ed. 5. Philadelphia: W. B. Saunders Co., 1947
- II. Bowman, H. W.: Clinical Evaluation of Dextran as a Plasma Volume Expander. Journal of the American Medical Association, Sept. 1953
- III. Handbook of the Hospital Corps, United States Navy (NAVMED P-5004). Washington: U. S. Government Printing Office

PRESENTATION

- I. Medicaments administered to relieve pain and discomfort during emergency treatment

A. Barbiturates

1. Systemic effects

- a. Depress the central nervous system
- b. Are sedative and hypnotic to varying degrees

2. Types favored for emergency use

- a. For heightened nervous excitement
 - (1) Phenobarbital, 1/2 gr. (0.03 g.)
 - (2) Two or three times a day
- b. For nausea and vomiting caused by psychic shock
 - (1) Phenobarbital, 1/2 gr., or pentobarbital sodium, 1 1/2 gr.
 - (2) Two or three times a day
- c. As preliminary agents for or adjuncts to local anesthesia
 - (1) Pentobarbital sodium, 1 1/2 gr.
 - (2) Secobarbital sodium, 1 1/2 gr.

B. Opium alkaloids: depress the respiratory system

1. Morphine

- a. Unique in its power to relieve pain, allay fear, and induce euphoria
- b. PRECAUTIONS
 - (1) Do not use unless extreme pain is a contributing factor
 - (a) If the patient has head wounds
 - (b) When the patient is in shock

LESSON PLAN 15

- (2) For painful chest wounds use only if there is no pulmonary edema, pneumothorax, or hemothorax
- (3) NEVER GIVE MORPHINE TO THE "WALKING WOUNDED" IN THE FIELD: effects may cause them to go to sleep rather than to walk to a station for care of wounds

c. Dosages

- (1) Maximum single dose, $1/4$ gr.
 - (a) Amount contained in syrettes supplied in Armed Forces field kits
 - (b) Exceeds requirements for the maximum analgesic effect
- (2) Effective single dose, $1/8$ to $1/6$ gr.
- (3) Small doses, supplemented with barbiturates, are usually much more effective than large doses.

d. Administration

- (1) Intravenously
- (2) Intramuscularly
- (3) When no syringe is available, place $1/4$ gr. tablet under the tongue

2. Codeine

- a. One sixth the analgesic power of morphine
- b. One fourth the depressant effect of morphine
- c. Codeine sulfate, $1/2$ gr., combined with an analgesic (as aspirin, 10 gr.)

(1) Sedates the coughs of patients with chest wounds

(2) Relieves minor pain

C. Salicylates: analgesic, antipyretic

1. Acetylsalicylic acid, 5 gr.

2. Popular names: aspirin, APC

a. Not too effective medicinally

b. Excellent palliative agent in time of emergency or stress

D. Anesthetics

1. Local

a. Procaine or lidocaine hydrochloride, 2 percent solution

(1) Inject, using local infiltration or block

(2) Administer with minimum disturbance to body functions

b. Tetracaine hydrochloride, 0.5 percent solution

(1) A topical anesthetic, useful on mucous membranes or eye surfaces

(2) Provided in many emergency treatment kits

2. General

a. Ethyl ether

(1) Considered by many authorities the most practical general anesthetic to use during an emergency

(2) Relatively safe but has several disadvantages

(a) Irritates the mucous membrane in high concentrations

LESSON PLAN 15

(b) Highly flammable in air or oxygen

(c) Deteriorates over a long period if not properly stored

b. Thiopental sodium; 1 to 2 percent solution

(1) To administer

(a) Inject 2 to 4 cc. initially

(b) Pause to ascertain patient's reaction

(c) Inject .25 to 1 cc. per minute until a total of 8 to 10 cc. has been administered

(2) See also lecture, "Field Anesthesia"

II. Medicaments administered to improve physiologic condition

A. Antiseptics

1. Soap and water

a. In Pharmacology, Therapeutics, and Prescription Writing, Bastedo says: "One certainty is that AS A RULE ANTISEPTICS USED ABOUT THE BODY DO NOT ACT INSTANTANEOUSLY, . . . but serve merely to cleanse. In preparation for operation, scrubbing with soap and water reduces the number of bacteria far more than any antiseptic. Alcohol rubbed on the skin before a hypodermic is merely a cleanser and not an antiseptic, and when a nurse covers a sterilized hypodermic needle with a pledget of cotton soaked in alcohol, she is applying to it unsterile material . . . Thus the practice of applying a germicidal solution for a very limited time creates a false sense of security."

b. The Navy recognized the ability of soap and water cleaning to reduce the probability of infection even in the days of the sailing ship; men were required to bathe and change clothes before any sea battle

2. Benzalkonium chloride (zephiran)

- a. A quaternary ammonium compound widely used by the Armed Forces
- b. Supplied in the Armed Forces Emergency kit
- c. Used in aqueous solution, 1:1000
 - (1) As a skin cleanser
 - (2) For instrument sterilization

3. Heat

- a. Most prevalently used "antiseptic" for emergencies
- b. Methods for use, in order of effectiveness
 - (1) Autoclaving, or steam under pressure
 - (2) Boiling
 - (3) Dry heat, temperatures of 350° to 400° F.
 - (4) In an emergency sterilize instruments in open flame

B. Antibiotics

- 1. Products of living microorganisms which kill or inhibit the growth of other microorganisms
- 2. Penicillin
 - a. Most beneficial of the antibiotics
 - b. Invaluable as a combatant of infection
 - c. Administration
 - (1) Orally, 1,500,000 units
 - (2) Parenterally, 300,000 units
 - (3) May also be used topically

C. Plasma volume expanders

- 1. Macrocellular colloids

LESSON PLAN 15

- a. Penetrate living membranes with difficulty
- b. Remain in the blood stream and "expand" the volume of blood
2. Developed as a substitute for whole blood
 - a. Whole blood cannot be stored for long periods
 - b. Plasma volume expanders can be stockpiled for use in mass emergency situations
3. Types of expanders
 - a. Gelatin
 - (1) Superior to saline
 - (2) Useful in the treatment of hemorrhagic and traumatic shock
 - b. Dextran
 - (1) Preferred for treatment of traumatic, neurogenic, or burn shock
 - (2) Always administered intravenously
 - (3) Infused at the rate of 20 to 40 cc. per minute
 - c. Polyvinylpyrrolidone (PVP)
 - (1) A plastic product used in Germany during World War II
 - (2) Causes no known toxic reaction
 - d. Others

APPLICATION

I. Instructor's demonstration

A. Intramuscular administration of morphine

1. Use syrette from the emergency kit and facsimile arm or manikin
 2. Show precautions that must be taken
 3. Illustrate method of indicating that patient has been given morphine
 - a. "M" on forehead
 - b. Time of administration
- B. Intravenous administration of medicaments
1. Use manikin, facsimile arm, syringes, and needles
 2. Refer to procedures demonstrated in lecture, "Parenteral Therapy"
 - a. Present procedures constitute an extension and special application of those in the previous lecture
 - b. Show how to secure equipment to place for prolonged administration of medicaments
- C. Use of the benzalkonium applicator
- II. Trainees' practice
- A. Use facsimile arm to practice administration of medicaments
- B. Answer questions by instructor
1. Situations in which various medicaments would be employed
 2. Precautions to be followed in each instance
- C. Procedures to be used to identify patients who have been given morphine injections

LESSON PLAN 16

TITLE: RESUSCITATION

OBJECTIVES

- I. To develop trainee understanding of the problems involved in artificial respiration
- II. To acquaint the trainee with the techniques for rescue breathing and manual methods of artificial respiration
- III. To give the trainee practice in artificial respiration procedures

TRAINING AIDS

- I. Films
 - A. Resuscitation - First Aid, Part 4, Mouth to Mouth, Mouth to Nose (MA-9559). Color, sound, 23 minutes
 - B. First Aid for Asphyxia (MN-8181). Color, sound, 24 minutes
- II. Resuscitation aids
- III. Mouth-to-mouth training models available commercially
- IV. Chalkboard, chalk, erasers

REFERENCES

- I. American National Red Cross: First Aid Textbook, ed. 4. Garden City, New York: Doubleday and Company, Inc., 1957
- II. Handbook of the Hospital Corps, United States Navy (NAVMED P-5004). Washington: U. S. Government Printing Office
- III. Young, C. B.: First Aid and Resuscitation. Springfield, Ill.: Charles C Thomas, 1954
- IV. Seeler, H. W.: A Mouth-to-Mask Resuscitation Device. U. S. Armed Forces Medical Journal X:761, July 1959
- V. Safar, P., and McMahon, M.: Mouth-to-Airway Emergency Artificial Respiration. Journal of the American Medical Association 166:1459, Mar. 1958

- VI. Kouwenhoven, W. B., et al: Closed-Chest Cardiac Massage.
Journal of the American Medical Association 173:1064,
July 1960
- VII. Elam, J. O., et al: Resuscitation of Drowning Victims.
Journal of the American Medical Association 174:13,
Sept. 1960

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. Asphyxia may result from many casualty situations
 - 1. Drowning
 - 2. Breathing air depleted of oxygen
 - 3. Shock (see lecture, "Casualty Treatment of Shock")
 - 4. Burial under debris with consequent chest compression
 - 5. Electric shock
 - 6. Excessive use of drugs or alcohol
 - 7. Inhalation of smoke or poisonous gas
 - 8. Wounding or disease which interferes with normal respiration
 - 9. Occluded airway
 - B. An asphyxiated person soon loses control of musculature and consciousness
 - C. Without immediate artificial respiration, casualty may die

LESSON PLAN 16

PRESENTATION

I. Methods of administering artificial respiration

A. Manual

1. Prone pressure
2. Hip lift-back pressure
3. Arm lift-chest pressure
4. Arm lift-back pressure
5. Eve's method

B. Mechanical

1. Very efficient
2. Nontiring to operator
3. Many have signal to warn of obstructed airway and are equipped with an aspirator to clear it
4. Excellent for the resuscitation of patients with multiple injuries

C. Mouth-to-mouth

1. Most effective method immediately available
2. Endorsed by the Armed Forces

II. Choice of method

A. Determining factors

1. Condition of patient
2. Availability of equipment
3. Training of personnel
4. Environment (surroundings)

- B. Skill in manual methods is desirable for use when mouth-to-mouth method is contraindicated

III. Procedures applicable to all methods

A. BEGIN AT ONCE

1. Transport only as far from scene of accident as absolutely necessary for safety
2. Don't wait for help or equipment to arrive
3. Position patient and proceed

B. Clear and maintain airway

C. Continue artificial respiration without interruption

1. Until patient is breathing well
2. Until it is certain that attempts are useless

D. Synchronize efforts with patient's attempts to breathe independently

E. When patient revives, treat to prevent shock

1. Keep warm
2. Remove wet clothing
3. Give warm coffee, tea, or water WHEN FULLY CONSCIOUS
4. Have patient lie quietly to conserve energy

F. Keep close watch on patient even after breathing is apparently normal

G. Use stretcher to transport patient

APPLICATION

I. Instructor's demonstration: use training model

A. Mouth-to-mouth resuscitation

1. Place patient on back
2. Clear mouth of debris
3. Extend neck

LESSON PLAN 16

4. Grasp mandible, pull and hold in forward position
5. Pinch nostrils
6. Seal mouth over patient's mouth
7. Blow until chest lifts
8. Remove mouth and listen for return rush of air indicating air exchange
9. Seal, blow, and listen; repeat 10 to 15 times per minute as necessary
10. If there is no indication of air exchange
 - a. Check position of head and jaw
 - b. Turn victim on side and percuss between shoulder blades to dislodge any foreign matter
 - c. Clear victim's mouth and resume rescue breathing

B. Other methods

1. Proprietary devices
2. Arm lift-chest pressure
3. Arm lift-back pressure
4. Mechanical resuscitator

II. Trainees' practice: methods demonstrated, as time permits

III. Closed-chest cardiac massage

- A. A closely related resuscitative measure should be considered for presentation at this time
- B. Reference VI describes the technique

IV. Film showing: prepare projector and film in advance

TITLE: RADIATION INJURY, BACTERIAL AND CHEMICAL WARFARE

OBJECTIVES

- I. To acquaint the trainee with the symptoms of radiation injury
- II. To familiarize the trainee with basic atomic radiation theories
- III. To familiarize the trainee with the problem of fallout

TRAINING AIDS

Films

- A. Medical Aspects of Nuclear Radiation (MA-7405).
- B. Fundamentals of Radiac Instruments (MA-8442).
Black and white, sound, 25 minutes
- C. Medical Defense Against Biological Warfare-Basic Plan After Attack (MN-8549C). Color, sound, 20 minutes
- D. Nerve Gases, Part I, "Field Recognition and Self-Aid Procedures" (MA-8882A). Black and white, sound, 27 minutes

REFERENCES

- I. Conard, R. A.: The Diagnosis and Treatment of Radiation Injuries. Lecture presented in course on Medical Aspects of Special Weapons, Naval Medical School, Bethesda, Md.
- II. Cronkite, E. P.: Atomic Warfare Medicine. U. S. Naval Institute Proceedings. Sept. 1951
- III. Cronkite, E. P.: Radiation Illness: Its Pathogenesis and Therapy, chapter X in Atomic Medicine, C. F. Behrens, ed. New York: Thomas Nelson & Sons, 1949
- IV. Conard, R. A., et al: Skin Lesions, Epilation, and Nail Pigmentation in Marshallese and Americans Accidentally Contaminated with Radioactive Fallout. Research Report, Project NM 006 012.04.82. Naval Medical Research Institute, Aug. 1955

LESSON PLAN 17

- V. ABC Warfare Defense (NAVMED-10099). Washington: U. S. Government Printing Office, 1960
- VI. Federal Civil Defense Administration: Radioactive Fallout (PA-7). Washington: U. S. Government Printing Office, 1951

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. An ability to recognize early signs of radiation sickness will aid in the proper triage of casualties under disaster conditions
 - B. Internal radiation injuries from contaminated air, food, and water must be recognized
 - C. Special procedures must be followed and special precautions observed in a fallout area. Variations in fallout due to weather conditions must be recognized and procedures modified accordingly

PRESENTATION

- I. Results of an atomic explosion
 - A. Blast
 - B. Heat
 - C. Nuclear radiation
 - 1. Initial
 - a. Chief protection is distance
 - b. If blast and heat don't harm, neither will initial radiation
 - c. Components
 - (1) Alpha and beta particles

- (a) Penetrate poorly
- (b) Effectively stopped by paper or clothing
- (c) Danger in prolonged contact of beta particles with skin
- (d) Damaging ionization may occur if alpha and beta particles enter body through open wounds, eating, or breathing

(2) Gamma rays

- (a) Greatest destructive force in direct radiation
- (b) Extremely penetrating
- (c) Necessitate good protective shielding
 - 1. Metal: lead or iron
 - 2. Cement
 - 3. Soil

(3) Neutrons

- (a) Similar to gamma rays in penetration and damage
- (b) Require similar shielding as gamma rays

2. Residual: fallout

- a. Cloud of radioactive particles
 - (1) Produced by surface burst
 - (2) May be carried for some distance
 - (3) May settle on and contaminate buildings, people
- b. Contact with the human body makes residual radiation a problem

LESSON PLAN 17

- (1) Alpha particles have little penetrating power
- (2) Beta particles can cause skin lesions
 - (a) Depending upon the amount of fallout in direct contact
 - (b) Depending upon the lapse of time between the blast and the contaminating contact

II. Variations in radiation

A. According to degree of contact with earth's surface

- 1. Air burst
 - a. Large amount of immediate direct radiation
 - b. Little or no residual radiation
- 2. Subsurface blast
 - a. Less direct radiation
 - b. More residual radiation
- 3. Surface blast
 - a. Less effective direct radiation
 - b. More residual radiation from debris lifted into the column of air resulting from such a blast
- 4. Underwater burst
 - a. Less direct radiation
 - b. Large amount of residual radiation from material contained in the resultant air column

B. According to weather conditions

- 1. Clouds or rain decrease the amount of direct radiation

2. Wind direction and velocity cause variations in area, direction, and extent of radioactive fallout

C. According to time lapse

III. Radiation detection

- A. Important consideration in disaster planning
- B. Many methods have been suggested
 1. Individual personal dosimeters
 - a. Pocket dosimeter-ion chamber
 - b. Glass dosimeter-phosphor glass
 - c. Film badge-photographic film
 2. Some disadvantages of individual dosimeters
 - a. Difficulty in persuading people to wear them
 - b. Not especially accurate
 - c. Interpretation of reading may mislead

IV. Radiation sickness

A. Diagnosis

1. Early signs and symptoms
 - a. Vomiting
 - (1) The day after the blast
 - (2) The heavier the radiation dosage, the sooner vomiting begins
 - b. Itching skin
 - c. Burning eyes
 - d. Tingling of exposed parts
2. Location of patient in relation to the source of radiation

LESSON PLAN 17

B. Treatment

1. Display of symptoms determines whether casualty must be treated for radiation sickness
2. Centers will be set up to give definitive treatment
 - a. Whole blood
 - b. Antibiotics
 - c. Nourishing food

V. Film showing: prepare films and projector in advance

VI. Bacterial and chemical warfare

The reader is referred to NAVMED-10099, listed under References of Lesson Plan 17, for use with Training Aids "C" and "D" on page 129

TITLE: PSYCHOLOGICAL FIRST AID

OBJECTIVES

- I. To inform the trainee of the most common psychological reactions to disaster
- II. To develop trainee understanding of some of the principles basic to helping any emotionally disturbed person
- III. To offer some practical suggestions for the application of basic principles of psychological first aid

TRAINING AID

Film: Combat Psychiatry-The Battalion Medical Officer (MN-7499A). Black and white, sound, 36 minutes

REFERENCE

Psychological First Aid in Community Disasters (NAVMED-P-5037). Washington: American Psychiatric Association, Committee on Civil Defense, 1954

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. In all disasters, whether they result from the forces of nature or from enemy attack, the reactions of the people involved may be quite different from their usual behavior
 - B. It is vital for disaster workers to have some familiarity with common patterns of reaction to unusual emotional stress and strain
 - C. The principles described here are widely applicable to any community disaster and understanding of them is essential for those who are to help the victims of floods, fires, tornadoes, and other natural catastrophes

LESSON PLAN 18

- D. Awareness of certain psychological facts will greatly simplify care of disaster victims

PRESENTATION

I. Reactions to disaster

- A. Vary in proportion to nature and magnitude of the disaster
- B. May be separated into five categories for clarity

1. Normal

- a. Remarkable calmness
- b. Transitory reactions
 - (1) Profuse perspiration
 - (2) Trembling
 - (3) Temporary weakness and nausea
 - (4) Difficulty in thinking clearly for a time
- c. Swift recovery of composure

2. Individual panic

- a. Unreasoning attempt to flee supplants judgment
 - (1) Notoriously contagious
 - (2) A few individuals in blind flight can precipitate mass headlong flight
 - (a) Disasters at sea: overcrowded lifeboats stormed by terrified passengers who seem unaware of partly filled boats nearby
 - (b) Theater fires: single exit stampeded with other obvious exits available
- b. Pointless physical activity

(1) Uncontrolled weeping

(2) Wild running about

(3) Causes

(a) Avenues of escape are threatened, or believed to be by progression of danger

(b) Horror at the appearance of gruesomely mutilated loved ones, especially if little or no personal injury has been sustained

c. Rapid, orderly effort to escape a perilous situation is no sign of panic

(1) When source of danger is real

(2) If no useful purpose can be served by remaining

3. Depression

a. Withdrawal

b. Vacant gaze

c. Disinclination to communicate

d. Apparent complete unawareness of the situation

e. Lack of emotional reaction

f. Inability to initiate action or assume responsibility

(1) For self

(2) For group

4. Overactivity

a. Rapid talk

b. Inappropriate jokes

LESSON PLAN 18

- c. Activity which at first seems purposeful later is recognized as pointless
 - d. Inability to resist distraction
 - e. Suggestions and demands of little real value
 - f. Exaggerated confidence in own abilities
 - (1) Causes intolerance of others' ideas
 - (2) Can become a nucleus of opposition to sound procedures
5. Bodily reactions
- a. Normal temporary responses to unusual stress
 - (1) Do not interfere with ability to act constructively in a difficult situation
 - (2) May not appear until the danger has been met and surmounted
 - b. Sustained, disabling reaction
 - (1) Severe nausea and vomiting
 - (a) May result from exposure to warfare agents
 - (b) Emotional reaction of unexposed individuals
 - (2) Conversion hysteria
 - (a) Unconscious conversion of anxiety into belief that some part of the body has ceased to function
 - 1. Hearing, speech, or sight may be lost
 - 2. Feeling or power may disappear from one or more limbs
 - (b) Reduces the previously overwhelming anxiety

(c) Complaints should not be considered malingering

1. Casualties are unaware that no physical basis for their condition exists

2. Disability is as real to them as physical injury

C. May show features of more than one category, either simultaneously or in successive stages

D. Must be dealt with differently, according to manifestations

III. Principles basic to providing maximum service to the emotionally disturbed

A. Accept each person's right to have his own feelings

1. Avoid blame or ridicule

2. Help relieve tensions which contributed to reaction

a. Encourage him to talk of his experiences

b. Find out if he is concerned about family or friends

3. Seek to see the situation from his point of view

a. Be warmly interested, not enveloping or maudlin

b. Attempt to understand may be just the aid needed

B. Accept a casualty's limitations as real

1. Guard against tendency to resent intangible disabilities

2. Feelings of incompetence or overconfidence are disabling

C. Evaluate a casualty's potentialities

LESSON PLAN 18

1. Question him for clues to his basic abilities, interests, and normal occupation
 - a. Treat him as a potentially valuable member of your disaster team
 - b. Show respect for him as sincerely as you can
 2. Help find a way to utilize his skills as quickly as possible
 - a. Manually skilled can straighten the immediate area
 - b. Clerically skilled may assist in simple jobs involving messages or records
 3. Work can serve as first step back to normalcy
- D. Accept your own limitations
1. Establish priorities about what you will undertake, according to your strength and skill
 - a. Your assigned job
 - b. Jobs assigned to others who are themselves casualties
 - c. Other jobs within the limits of your capacities
 2. Appraise yourself candidly
 - a. Expect some disruption under stress of your psychological defenses
 - (1) Personal anxieties
 - (2) Frustration at imperfections in recovery operations
 - (3) Fatigue
 - b. Know your weaknesses well
 - (1) Impulsiveness
 - (2) Irritability

(3) Sensitiveness to criticism

(4) Proneness to prejudice

(5) Malice

c. Learn to modify your emotional reactions promptly

(1) Your "emotional wounds" will deter your service to others with emotional difficulties

(2) Knowledge, training, and experience as a disaster worker can serve to protect

IV. Application of psychological first aid principles

A. Only experience can teach the value of the principles

B. Course of individual reactions will make clear who is in need of aid

1. Loss of control may be delayed

2. Progress in regaining composure may be slow

C. Normal reaction: little or no help needed

D. Individual panic

1. Will respond least to application of principles

2. Early segregation is urgent

a. Gaining attention will be difficult

b. Behavior will be disturbing to all

c. May precipitate a state of general panic

3. Method of control depends upon facilities available

a. Try gentle firmness first

b. If necessary enlist aid to help transport casualties to the nearest operating aid station

LESSON PLAN 18

- c. If workers are isolated from all medical facilities
 - (1) Ask two or three fellow workers to remain with the casualty until help arrives
 - (2) Physical restraint may be necessary
 - (a) Firm but not brutal or punitive
 - (b) Abusive tactics usually fail, also increase group anxieties
- d. Prompt control of panic discourages its spread

E. Depressed reactions

- 1. Most likely to respond as desired to methods suggested
 - a. Constructive interest
 - b. Encouragement to undertake simple, routine jobs
- 2. Elderly people and children present special problems
 - a. Described methods will be reasonably effective
 - b. Older persons
 - (1) Become more confused than younger people
 - (2) Respond more slowly and not as well to care
 - c. Children
 - (1) Reactions reflect attitudes of adults
 - (2) Calm, realistic assurances help them recover equanimity
 - d. Both the aged and children should be given as much quiet supervision as possible after a disaster

F. Overactive responses

1. First task will be to gain attention
2. Contact can be established
3. These individuals can regain composure under proper supervision
4. Excess energies will make the need for physical activity great
 - a. Can cause serious trouble by "scapegoating"
 - (1) Criticizing the general stupidity of authority
 - (2) Blaming a particular person or group for the disaster
 - (3) Attitudes can be extremely contagious
 - b. Encourage their participation in cleaning up rubble or engaging in rescue operations
 - (1) Explain the need for immediate repair of damage
 - (2) Make clear that responsibility can be fixed later

G. Bodily reactions

1. Immediate relief of disturbances will probably be impossible
2. Calmness and a display of interest will help
3. Encourage by-passing of disability as much as possible
 - a. Find small jobs that can be done in spite of symptoms
 - b. Help them to regain their composure while awaiting medical attention

V. Use of sedatives

- A. Administer sedatives only as a last resort

LESSON PLAN 18

1. Add to the psychological casualty's confusion
 2. Make approved treatment methods less effective
 3. Often large, dangerous doses are required for desired effect
 4. Paradoxical responses are not uncommon
- B. Rely on methods discussed to help casualty with emotional disabilities
- C. If the use of sedatives is unavoidable tag casualty to prevent fatal overdosage
1. Record of any medicine given
 2. Time medicine was administered

VI. Dealing with casualties who do not respond

- A. Panicky individuals should receive trained, specialized care promptly
- B. Sufferers from depression and with severe bodily reactions are less urgent cases
1. May receive group therapy temporarily
 2. Should also receive medical care
 3. Physical needs should be met while they wait
- C. Overactive individuals must be tolerated until they disrupt the work of others
1. Try to persuade them to join those awaiting medical attention
 2. If diplomacy fails restraint may be necessary

VII. Mass reaction may become a serious burden in any disaster

- A. Control of disturbed groups requires leadership techniques beyond those required for control of disturbed individuals
- B. Learning and applying principles of psychological first aid will contribute to the prevention of crowd activity

1. Successful restriction of the influence of one panicky person
2. Deft control of an overactive, resentful person

C. Avoidance of mob activity is the best control

VIII. Film showing: prepare film and projector in advance

LESSON PLAN 19

TITLE: TRANSPORTATION OF CASUALTIES

OBJECTIVES

- I. To teach the trainee procedures and precautions for initial transportation of casualties
- II. To give the trainee practice in such procedures

TRAINING AIDS

- I. Stokes stretcher
- II. Non-Traumatic Carrier
- III. Army litter
- IV. Materials from which litters can be improvised, such as poles, coats, and blankets
- V. Films
 - A. Transportation and Evacuation of Casualties in a Marine Division (MN-7334). Black and white, sound, 17 minutes
 - B. First Aid Handling and Transporting of the Injured (MN-8487), Parts B and C. Black and white, sound, 40 minutes (total)

REFERENCES

- I. Everhard, T. P.: Emergency Care of Atomic Bomb Casualties, part IV, First Aid and Transportation of the Wounded. Philadelphia Medicine, 46:661 (Dec. 30) 1950
- II. U. S. Federal Civil Defense Administration: Organization and Operation of Civil Defense Casualty Services (TM-11-1). Washington: U. S. Government Printing Office, 1953
- III. Young, C. B.: First Aid and Resuscitation. Springfield, Ill.: Charles C Thomas, 1954

INTRODUCTION

- I. Introduce yourself
- II. State objectives of lesson
- III. Explain importance of subject
 - A. Proper casualty transportation is an essential part of emergency treatment
 1. Links emergency treatment performed to later definitive treatment
 2. Whatever the means of transportation, the casualty must be handled so that the good accomplished by skillful treatment at the scene of the disaster will not be undone and existing injuries will not be compounded
 - B. Elaborate plans on paper have little value if they cannot be applied in a practical, well-organized manner
 1. Knowledge of basic principles and use of common sense will help solve unforeseen complications and hazards in time of disaster
 2. Many who would be litter patients in conventional disasters will be forced to move about and care for themselves when there are mass casualties

PRESENTATION

- I. Handling the patient
 - A. Lifting from accident site to litter
 1. This shortest trip the casualty makes may be the determining survival factor
 2. Use from 3 to 5 members of casualty team on each side
 - a. Lift the patient in unison

LESSON PLAN 19

- b. Guard against further injury from an overlooked, possibly unsplinted fracture
 - 3. Maintain casualty in level position
 - a. While litter is rolled or slid under him
 - b. Unless such a position is contraindicated
- B. Special problems
 - 1. Special positions for specific wounds
 - a. Knees elevated in presence of abdominal injuries
 - b. Head elevated, wounded side down in presence of chest injuries
 - c. Prone position instead of supine for pharyngeal injuries
 - 2. High altitude evacuation contraindicated for patients with head or chest injuries
 - a. If oxygen cannot be administered enroute
 - b. For patients with chest injuries if atmospheric pressure cannot be controlled
- C. Duties of attendants
 - 1. Remain in constant attendance during transportation
 - a. Ensure comfort
 - b. Prevent complications from developing
 - c. Provide proper support
 - d. Maintain splints
 - e. Provide sedation as needed
 - f. Assist the vomiting patient
 - g. Keep airways open

h. Keep patient with blankets over and under him

i. Maintain parenteral therapy as required

2. Above all reassure the patient

II. Evacuating the patient

A. Statistics of World War II reveal importance of immediate hospitalization

1. Casualties with abdominal wounds who received hospital treatment from 1 to 2 hours after injury had a survival rate of 90 percent

2. Where hospitalization was delayed 6 to 8 hours casualties had a survival rate of only 60 percent

B. Present concept for use of tourniquets is based on premise of rapid evacuation and prompt, adequate treatment: once applied they are not loosened until definitive care is possible

C. Transportation methods

1. Navy's organized use of helicopter has saved many lives

a. During the Korean conflict

b. During USS Bennington disaster

2. Wildly speeding ambulance is not conducive to good casualty care

a. May intensify pain, compound injuries, and aggravate shock

b. Fear and anxiety created may harm the patient

3. In general speed should be confined to first aid procedures

LESSON PLAN 19

APPLICATION

- I. Film showing: prepare film and projector in advance
- II. Instructor's demonstration: use trainees as examples of casualties
 - A. Use of Stokes stretcher, Non-Traumatic Carrier, and Army litter
 - B. How to properly place and hold casualties for transportation
 - C. How litters can be improvised from available materials
 - D. Carry procedures given in the Handbook of the Hospital Corps
- III. Trainee practice
 - A. Procedures for lifting casualties
 - B. Special positions for various injuries

TITLE: EXPOSURE TO THE ELEMENTS

OBJECTIVES

- I. To develop the trainees' understanding of the problems created by exposure to the elements
- II. To acquaint the trainee with the first aid procedures employed in the treatment of heat casualties
- III. To acquaint the trainee with the first aid procedures employed in the treatment of cold casualties

TRAINING AIDS

Films

- A. First Aid for Heat Stroke and Heat Exhaustion (MN-8186). Color, sound, 20 minutes
- B. Prevention of Cold Injuries (MN-8851). Black and white, sound, 20 minutes

REFERENCES

- I. Emergency War Surgery, NATO Handbook (NAVMED P-5059). Washington: U. S. Government Printing Office
- II. Mackie, T. T., Hunter, G. W., and Worth, C. B.: A Manual of Tropical Medicine, ed. 2. Philadelphia: W. B. Saunders Co.
- III. Combat and Field Medicine Practice (NAVMED-10819A). Washington: U. S. Government Printing Office
- IV. Handbook of the Hospital Corps, United States Navy (NAVMED P-5004). Washington: U. S. Government Printing Office
- V. American National Red Cross First Aid Textbook, ed. 4. Philadelphia: W. B. Saunders Co.

INTRODUCTION

- I. Introduce yourself

LESSON PLAN 20

II. State objectives of lesson

III. Explain importance of subject

- A. The breakdown of those physiological processes which enable man to maintain a normal body temperature produces optimum conditions for disease or injury
- B. Exposure to cold may accelerate the loss of needed body heat and cause trauma or worsen the condition of patients with exposed wounds or injuries
- C. Heat or a combination of heat and physical exertion may slow the rate at which surplus heat is dissipated from the body and result in injury
- D. In order to prevent exposure injury and to reduce mortality and morbidity resulting from exposure in a mass casualty situation, all personnel concerned with the care of mass casualties should be familiar with the symptoms and treatment of the conditions caused by exposure

PRESENTATION

I. Effects of exposure to excessive heat

- A. Physiologic response: increased heat dissipation through physical mechanisms
 - 1. Vasodilation
 - 2. Accelerated pulse and respiration
 - 3. Profuse perspiration
 - 4. Reduction in capacity for muscular work
- B. Traumatic conditions
 - 1. Heat exhaustion (heat prostration, heat syncope)
 - a. Definition: response to exposure to excessive heat characterized by prostration and varying degrees of circulatory collapse accompanied by little if any rise in body temperature

- b. Etiology: loss of salt and water from the body with resultant dehydration
 - (1) Lowered blood volume
 - (2) Circulatory collapse
- c. Contributing factors
 - (1) Physical condition
 - (a) Advanced age
 - (b) Obesity
 - (c) Acute alcoholism
 - (d) Impairment by disease
 - (2) Hard physical work
 - (3) Heavy tight clothing
 - (4) Lack of ventilation
- d. Symptoms
 - (1) Headache; unusual tiredness; dizziness; dim or disordered vision; shallow respiration; cramps; nausea; vomiting; marked pallor; cold, clammy skin; low blood pressure; small, weak, rapid pulse
 - (2) Must be differentiated from those of malaria, food poisoning, and chemical poisoning, which are almost identical
- e. Unconsciousness and death follow continued exposure
- f. Treatment
 - (1) Avoid further exposure and activity
 - (a) Remove patient to cool area
 - (b) Treat for shock
 - (2) Correct dehydration and salt deficiency

LESSON PLAN 20

- (a) Give saline solution by mouth if patient is conscious
 - 1. One-half teaspoonful salt per quart of liquid
 - 2. Every 15 minutes for three or four doses
 - (b) Infuse physiologic saline solution intravenously in severe cases
 - (3) Encourage circulation of the blood
 - (a) Elevate the feet
 - (b) Move or massage the extremities
 - (c) If temperature is subnormal
 - 1. Wrap patient loosely in blankets
 - 2. Apply hot water bottle to feet
 - (4) Give cardiac stimulants if necessary
2. Heatstroke (heat pyrexia, sunstroke, heat hyperpyrexia, thermic fever, sun traumatism, siriasis)
- a. Definition: response to exposure to excessive heat and humidity characterized by high fever, circulatory collapse, and, in severe cases, coma, convulsions, and death
 - b. Etiology: profound disturbance or failure of the heat-regulating mechanism of the body
 - c. Contributing factors
 - (1) Hard physical work
 - (2) Heavy tight clothing
 - (3) Lack of ventilation
 - (4) High humidity
 - d. Symptoms

- (1) Advance warning signals: absence of sweating, frequent desire to urinate, weakness, lassitude, headache, dizziness, loss of appetite, nausea, increase in body temperature and pulse rate, muscle cramps
- (2) Early stages: contracted pupils; vomiting; muscle twitch; anxiety or mental derangement; hot, red, dry skin; full, regular pulse; normal blood pressure; elevated body temperature (105° to 110° F.); delirium, progressing to coma; convulsions
- (3) Later stages; dilated pupils; shallow, irregular breathing; weak, irregular pulse; below-normal blood pressure
- (4) Must be differentiated from those of malaria, meningitis, and pneumonia

e. Treatment

- (1) Reduce the body temperature as rapidly as possible
 - (a) Remove clothing
 - (b) Place in cold water, pour cold water over body, or rub with ice
 - (c) Massage extremities toward the heart to assist circulation
 - (d) Take rectal temperature every 10 minutes
 - (e) Give cold salt water enemas (1500 to 3000 cc.) if temperature does not readily reduce
 - (f) Remove to bed and cover lightly when temperature drops to 102° to 103° F.
- (2) Maintain normal body temperature
 - (a) Avoid excessive cooling

- (b) Make certain that temperature readings are uninfluenced by water or environment
- (3) Infuse physiologic saline solution intravenously if dehydrated
- (4) Give cool drinks when consciousness returns
- (5) For milder cases: cool with cold sponges, wet packs, and fanning
- f. Recovery
 - (1) Temperature falls rapidly
 - (2) Sweating resumes
 - (3) Bed rest and protection against even moderately high temperatures are required
 - (a) Casualties often remain abnormally susceptible to heat
 - (b) Relapses are frequent
 - (c) Evacuate if possible
 - (4) Heart and kidney diseases and chronic alcoholism minimize possibilities for recovery
- 3. Heat cramps (stoker's cramps, miner's cramps, fireman's cramps, cane cutter's cramps)
 - a. Definition: painful cramps of the skeletal muscles following exertion in high temperatures
 - b. Etiology: lack of chloride in the tissues
 - (1) Loss of much water and sodium chloride through profuse perspiration
 - (2) Replacement with water only

- c. Symptoms: Mild cramps in the extremities, gradually increasing in severity and finally involving the major muscle groups of the extremities and abdominal wall
 - (1) Disabling
 - (2) Extremely painful
 - (3) May recur for many hours unless checked
 - (4) Often associated with heat exhaustion
- d. Contributory factors
 - (1) Exposure to unusual heat combined with muscular exertion
 - (2) Previous attacks
- e. Treatment
 - (1) Encourage rest
 - (2) Massage affected areas with firm pressure
 - (3) Apply warm, wet towels
 - (4) Give saline solution by mouth
- f. Recovery is usually rapid

II. Effects of exposure to excessive cold

- A. Physiologic response: increased heat conservation and production through physical mechanisms
 - 1. Cutaneous vasoconstriction to prevent heat loss at surface
 - 2. Muscular contraction to produce more heat
 - a. Shivering
 - b. "Gooseflesh"
 - 3. Increased metabolic activity
- B. Traumatic conditions

LESSON PLAN 20

1. All represent varying degrees of a fundamental pathologic process
 - a. Initial peripheral vasoconstriction
 - (1) Cooling of skin surface
 - (2) Reduced or halted blood circulation
 - (3) Oxygen starvation of tissues
 - b. Degree and duration of vasoconstriction determine the amount of damage to tissues involved
2. Contributing factors
 - a. Weather
 - b. Clothing
 - c. Physical condition
 - d. Duration of exposure time
3. Types of injury
 - a. Chilblains
 - (1) Result from exposure to temperatures above freezing associated with high humidity
 - (2) Frequently affect the hands
 - b. Immersion foot
 - (1) Results from exposure to water at temperatures usually below 50° F.
 - (a) Usually in excess of 12 hours
 - (b) Immersion in sea water at 50° F. may cause death in less than 1 hour
 - (2) May occur in hot, damp tropical environment
 - c. Trenchfoot

- (1) Results from prolonged exposure to cold at temperatures ranging from just above freezing to 50° F.
 - (a) Often in a damp environment
 - (b) Usually in connection with immobilized and dependent extremities
 - (2) May also occur in the hands
- d. Frostbite
- (1) Crystallization of tissue fluids in the skin or subcutaneous tissues after exposure to temperatures of 32° F. or lower, and low relative humidity
 - (2) Exposure time may range from 1 to 20 hours
 - (a) Average duration is 10 hours
 - (b) Severe injury may be instantaneous in very low temperatures
4. Symptoms: uncomfortable coldness, followed by numbness; stinging, tingling, aching sensations; cramping pain; lack of feeling in affected part; flushed skin, changing to waxy white
5. Degrees of severity: manifested after rewarming
- a. First-degree cold injury
 - (1) Hyperemia
 - (a) Skin is first mottled blue or purple
 - (b) Then becomes red, hot, and dry
 - (2) Edema
 - (a) Begins within 3 hours
 - (b) Persists 10 days or more if patient is ambulatory
 - (c) Disappears in less than 5 days if patient is on bed rest

LESSON PLAN 20

- (3) Desquamation of superficial layers of skin
 - (a) Begins 5 to 10 days after injury
 - (b) May continue for as long as a month
 - (4) Cyanosis of the digits
 - (5) Sensations persisting after recovery
 - (a) Deep-seated ache
 - (b) Paresthesia
 - (c) Abnormal perspiration of the injured part
 - (d) Coldness of the injured part
- b. Second-degree cold injury
- (1) Hyperemia and edema
 - (2) Superficial vesicles
 - (a) Within 12 to 24 hours of rewarming
 - (b) On great toe and heel
 - (c) On dorsum of one or more fingers
 - (3) Eschars form from drying vesicles
 - (a) Limit motion of the parts
 - (b) Desquamate, revealing easily traumatized skin
 - (4) Pain persists for 3 to 20 days
 - (5) Hyperhydrosis appears in 2 to 3 weeks
- c. Third-degree cold injury
- (1) Involves full skin thickness
 - (2) Extends into subcutaneous tissue
 - (3) Vesicles, drying to form eschars

- (4) Edema, usually disappearing within 6 days
- (5) Eschars desquamate, ulcer remaining epithelizes
- (6) Pain
 - (a) Begins within 5 to 17 days
 - (b) Lasts from 2 to 5 weeks
- (7) Hyperhydrosis and cyanosis appear within 4 to 10 weeks
- (8) Average healing time is 68 days
- d. Fourth-degree cold injury
 - (1) Destruction of entire thickness of the part
 - (a) Vesicles are present
 - (2) Edema may involve the entire extremity
 - (2) Loss of all injured tissues
 - (a) Process takes about 20 days
 - 1. Tissues become black, dry, shriveled or mummified
 - 2. Dry or moist gangrene ensues
 - (b) Line of demarcation appears in about 36 days and extends to bone 60 to 80 days after injury

6. Treatment

- a. Treat all casualties with involvement of the lower extremities as litter cases
- b. Remove constricting clothing
 - (1) Thaw boots and clothing frozen to the body by immersion in warm water

LESSON PLAN 20

- (2) Manipulate gently to lessen damage
- c. Rewarm frozen parts rapidly
 - (1) Immerse in water at 90° to 104° F.
 - (2) Place warm hands on injured part
 - (3) Expose injured part to warm air
- d. Maintain general body warmth
- e. Encourage sleep and rest
- f. Combat infection
 - (1) Give booster dose of tetanus toxoid
 - (2) Also give 300,000 units of penicillin
- g. Cover large vesicles or bullae with loose, dry dressings
- h. Prohibit smoking
- i. Evacuate for definitive care

III. Film showing: prepare film and projector in advance

